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# ***THE GULF COASTAL PLAIN ECOSYSTEM PARTNERSHIP: DEVELOPMENT OF CONSERVATION STRATEGIES AND PROJECTS***

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## PREFACE

This report is intended for the steering committee of the Gulf Coastal Plain Ecosystem Partnership (GCPEP). We have directed our style to those with technical expertise in natural resources, forest, wildlife and fire management.

We have written this report in chapters that focus on the first phase of a sequential planning process. This report focuses on the conservation of biological diversity in the context of the GCPEP. The document is intended to be used as a reference for the steering committee throughout the planning process and beyond.

The body of the report contains five chapters that summarize the planning process to date. Rather than provide a single concluding chapter, we summarized the key findings at the end of each chapter in a section called ("summary of findings") (except for Chapter five, which is a summary in and of itself).

Chapter one ("Introduction") provides a brief overview and background of the GCPEP and the planning process. Chapter two ("Conservation from an ecoregional perspective") provides an analysis of the conservation significance of the partnership, both individually and collectively. Chapter three ("Socioeconomic assessment") provides an overview of the regional human context. Chapter four ("Sustaining biodiversity at sites") provides an overview of site conservation planning, conservation target selection and threats to the targets. Chapter five ("GCPEP planning") summarizes the results of an initial planning meeting.

## CHAPTER 1. INTRODUCTION

### **The Gulf Coastal Plain Ecosystem Partnership**

The purpose of this annual report is to summarize progress in the project entitled "Integrated Gulf Coastal Plain Ecosystem Partnership," supported in part by the Legacy Natural Resource Program of the Department of Defense. The sponsoring Air Force installation is Eglin Air Force Base ("Eglin") located in the western Florida Panhandle approximately 20 km east of Pensacola, Florida. Eglin is a key member of the Gulf Coastal Plain Ecosystem Partnership, under which this project is organized.

The Gulf Coastal Plain Ecosystem Partnership ("GCPEP" or "Partnership") is a unique collaboration among Eglin AFB, The Nature Conservancy, Champion International Corporation, Blackwater River State Forest, Northwest Florida Water Management District, and National Forests in Alabama and Florida, who cooperate under the auspices of a 1996 multi-party memorandum of understanding. Together, these partners manage more than 840,000 acres in one of the most important conservation landscapes in the Southeast. In 1998, The Nature Conservancy, as a member of GCPEP, hired a local project director, Vernon Compton, to facilitate planning and project implementation under the direction of a steering committee made up of representatives from each GCPEP organization.

### **Conservation planning at the ecoregional scale**

One of the most important goals of this project is to develop a common set of voluntary conservation strategies consistent with each partner's individual legal mandates, mission and objectives. Cooperative conservation strategies, when developed, will explicitly recognize that collectively the Partners share interconnected ecosystems that stretch across their legal boundaries. One of the most important early challenges faced by the Partnership was to develop a regional perspective, based on the best available information, of the conservation value of each individual ownership and all GCPEP lands and waters in total.

The GCPEP members asked The Nature Conservancy ("TNC") to develop a regional assessment of biodiversity that the GCPEP could use to shape their collective conservation strategies. The partners tentatively adopted a set of conservation targets (that is, species and natural communities that become the target of conservation effort) suggested by Conservancy staff. The Nature Conservancy used a planning process termed *ecoregional planning* to determine which sites in the U.S. have the greatest conservation value (The Nature Conservancy 1996). The ecoregional planning process consists of 1) subdividing the U.S. into *ecoregions* based on Bailey (1995), 2) using the ecoregion as the basic planning unit, 3) reviewing all available information on the status of species, ecological groups and natural communities to choose *ecoregional conservation targets*<sup>1</sup>, 4) setting numeric *ecoregional conservation goals*<sup>2</sup> for

---

<sup>1</sup> Ecoregional conservation targets consist of G1-G2, declining, imperiled, or keystone species and all representative natural communities or ecological groups. This methodology encompasses the so-called *fine filter-coarse filter* approach, where rare and imperiled species act as the fine filter and where natural communities or ecological groups act as the coarse filters to pick up common species and important ecological processes, interactions and gradients occurring at larger spatial scales and higher levels of biological organization.

targets and 5) assessing all known occurrences of targets across the ecoregion to choose a suite of *conservation sites*<sup>3</sup> sufficient to meet the ecoregional target goals.

The GCPEP ownerships are located within the East Gulf Coastal Plain ecoregion (Fig. 1-1). The collective lands and waters contained within the Partnership (Fig. 1-2) were identified as one of the two most important conservation landscapes (e.g., large-scale sites) in the ecoregion based on the high concentration of target species, the landscape-level diversity of natural communities and the high quality of many of the occurrences (Table 1-1). A detailed summary of this information is found in Chapter 2.

### Conservation planning at the site scale

Once a site is determined to be important from an ecoregional perspective, then the known conservation needs of the ecoregional targets (e.g., life history requirements for individual species or groups of species) that occur at the site can be used to determine site boundaries and local threats to long-term persistence. The Nature Conservancy terms this process *site conservation planning* (The Nature Conservancy 1998a). Site conservation planning is undertaken from the perspective of the species and natural community targets occurring at a given site. Site conservation planning has the following components: 1) Identifying the ecoregional target species and natural communities that are present at a given site that serve as the *site conservation targets*; 2) assembling and assessing all available ecological information pertinent to the targets and the site; 3) assembling and assessing pertinent socioeconomic information (Chapter 3); 4) using this information to assess the *threats*<sup>4</sup> to the targets at the site. A preliminary assessment of targets and threats is included in Chapter 4. Once agreement on the targets and threats has been reached, then conservation *strategies* and *measures of success* can be developed. Strategies and measures of success will be summarized in the final report due January 31, 2000.

### Conservation planning process

Within, GCPEP, the conservation planning process has consisted of the following elements: 1) Documentation of individual partner objectives; 2) identification of common challenges and conservation issues; 3) tentative agreement on conservation targets; 4) identification and implementation of short-term joint projects; and 5) completion of two issues workshops (see below). The results of planning to date are summarized in Chapter 5.

### Issue workshops: Red-cockaded woodpeckers and prescribed fire

One of the most important ecoregional and site target species is the red-cockaded woodpecker (*Picoides borealis*) (RCW). The RCW is a small cooperative breeding woodpecker inhabiting fire-dependent old-growth pine forests of the Southeast. The RCW was one of the first

<sup>2</sup> For example, a goal might be 15 populations of bird species X, each population with at least 200 breeding pairs.

<sup>3</sup> A site is a mappable, defined place in the ecoregion that is sufficiently large enough to protect viable populations of species targets and/or functional examples of natural communities or ecological groups.

<sup>4</sup> A threat is defined as a stress and its source. For example, large-scale habitat fragmentation causes demographic isolation in red-cockaded woodpeckers populations (stress) as a direct result of traditional even-aged forestry practices (source of stress).

species listed as Endangered under the Endangered Species Act of 1973. The RCW has declined throughout its range primarily due to massive habitat loss. More recently, the RCW has become threatened by habitat degradation resulting from logging practices and fire suppression. In the GCPEP landscape, past logging practices have isolated many RCW breeding groups. While these destructive logging practices have largely been halted on partner lands, RCWs continue to decline. This issue was the topic of an issues workshop held at Eglin July 21–23, 1998 and is summarized in the attached report entitled “Adaptive management of red-cockaded woodpeckers in northwest Florida: Progress and perspectives” (Moranz and Hardesty 1998).

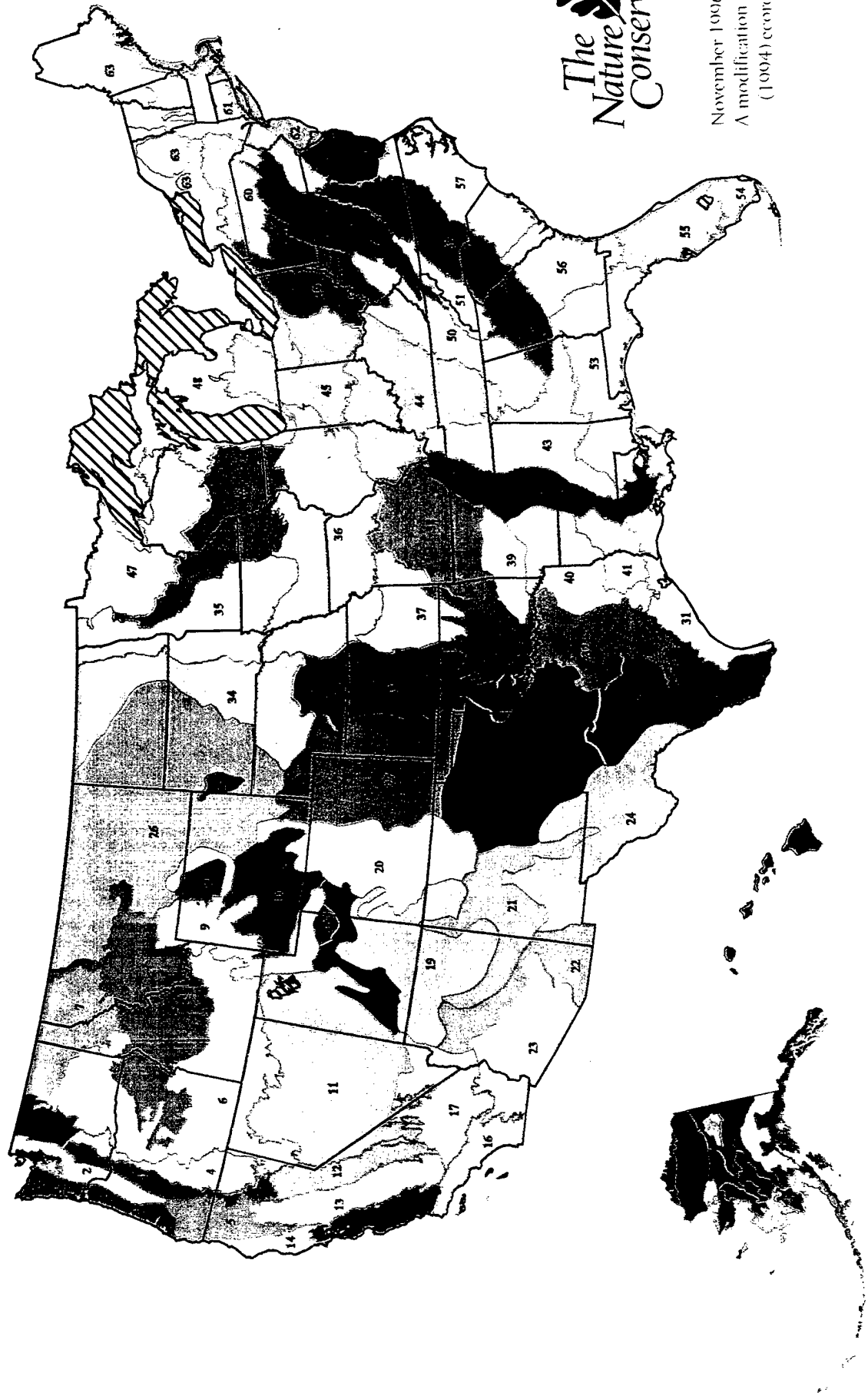
Fire is perhaps the single most important ecological process in longleaf pine-dominated uplands in the Southeast. Without fire, the many fire-adapted plant and animal species, and the longleaf pine itself, will decline. Because of past logging and fire management practices, many longleaf pine-dominated GCPEP areas and embedded communities are considered degraded. Reintroduction of fire is not a simple task, nor is maintaining and staffing the necessary large-scale prescribed fire program. Prescribed fire was addressed in a number of workshops. Summaries, in the form of Powerpoint™ presentations developed at the request of managers, were submitted to Eglin and Blackwater River State Forest managers immediately following the most recent workshops on February 22–25, 1999.

TABLE 1-1. Summary of conservation value of lands and waters included in the Gulf Coastal Plain Ecosystem Partnership.

Conservation Value of GCPEP
<ul style="list-style-type: none"> <li>• Despite being only 2% of the 42 million acre East Gulf Coastal Plain Ecoregion area, lands and waters included in the 840,000 acre Gulf Coastal Plain Ecosystem Partnership feature viable examples of 37% of 308 species targets and 38% of 297 natural community targets identified for the ecoregion as a whole</li> <li>• Protects &gt;163 rare or imperiled plant, lichen, vertebrate and invertebrate species, including at least 40 G1-G2 species</li> <li>• Encompasses 20–25% of the world’s remaining large tracts of longleaf pine, including the largest public ownerships and more than 50% of the remaining old growth stands</li> <li>• Features the highest quality barrier island complex on Florida’s Gulf Coast</li> <li>• The Choctawhatchee, Escambia-Conecuh and Yellow River watersheds and estuaries were identified as critical U.S. watershed hotspots (The Nature Conservancy 1998b) including at least 59 globally rare or imperiled species, and the Escambia River contains the richest and most imperiled fish assemblage in Florida</li> <li>• Includes &gt;900,000 acres of public land, including Eglin AFB (463K ac), Blackwater River State Forest (191K ac), Northwest Florida Water Management District (98K ac) and Conecuh National Forest (83K ac)</li> </ul>

FIGURE 1-1. Ecoregions of the U.S. as defined by Bailey (1995) and The Nature Conservancy. The project is located in the East Gulf Coastal Plain (see #53 on following page).

# Ecoregions of the United States



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Conservancy®

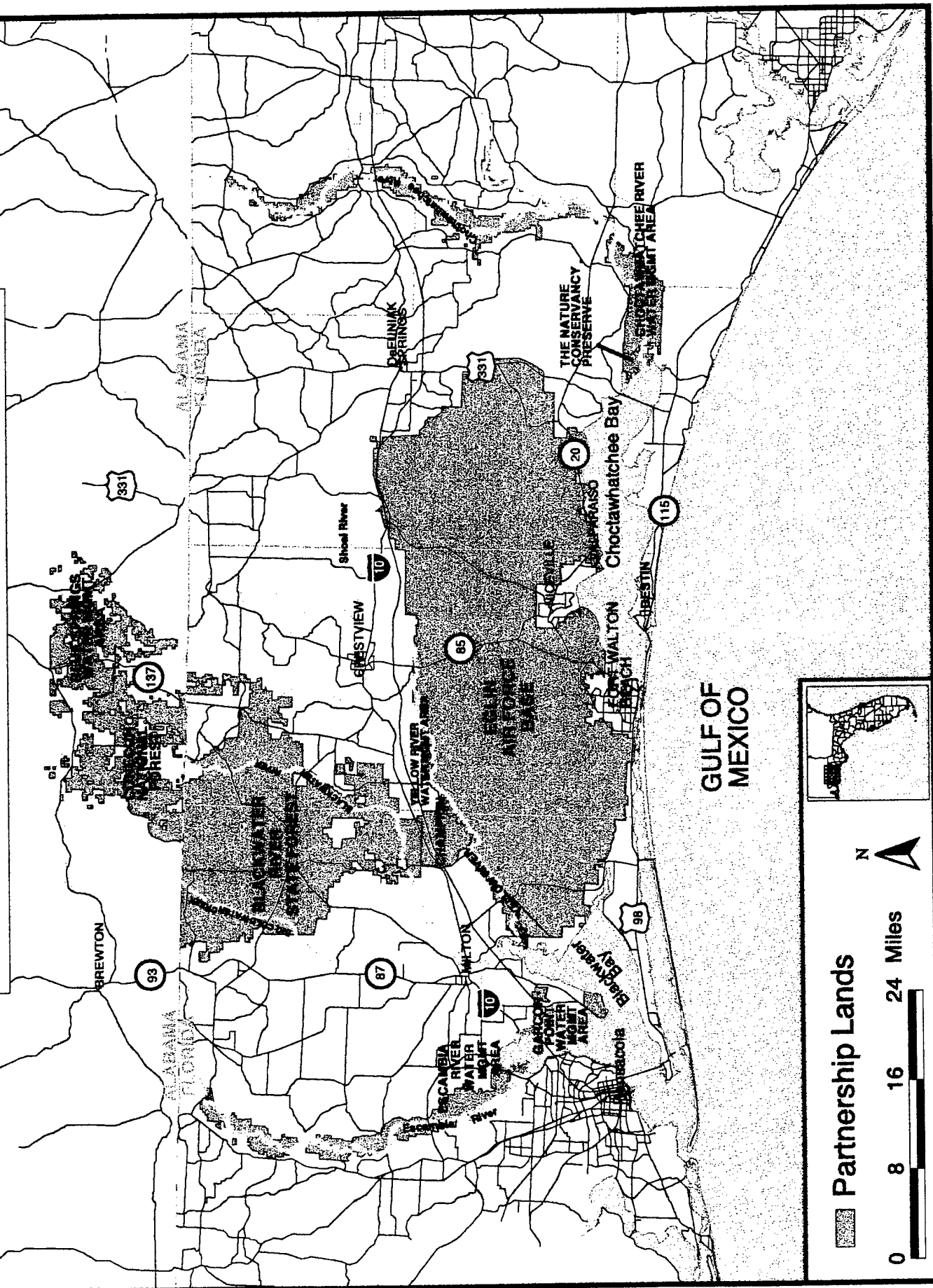
November 1996 version.  
A modification of Bailey's  
(1994) ecoregions.

1. West Cascades and Coastal Forests
2. Puget Trough and Willamette Valley
3. North Cascades
4. Modoc Plateau and East Cascades
5. Klamath Mountains
6. Columbia Plateau
7. Canadian Rocky Mountains
8. Idaho Batholith
9. Utah-Wyoming Rocky Mountains
10. Wyoming Basins
11. Great Basin
12. Sierra Nevada
13. Great Central Valley
14. California North Coast
15. California Central Coast
16. California South Coast
17. Mohave Desert
18. Utah High Plateaus
19. Colorado Plateau
20. Colorado Rocky Mountains
21. Arizona-New Mexico Mountains
22. Apache Highlands
23. Sonora Desert
24. Chihuahua Desert
25. Black Hills
26. Northern Great Plains Steppe
27. Central Shortgrass Prairie
28. Southern Shortgrass Prairie
29. Edwards Plateau
30. South Texas Plains
31. Gulf Coast Prairies and Marshes
32. Crosstimbres and Southern Tallgrass Prairie
33. Central Mixed-Grass Prairie
34. Northern Mixed-Grass Prairie
35. Northern Tallgrass Prairie
36. Central Tallgrass Prairie
37. Osage Plains/Flint Hills Prairie
38. Ozarks
39. Ouachita Mountains
40. Upper West Gulf Coastal Plain
41. Piney Woods
42. Mississippi River Alluvial Plain
43. Upper East Gulf Coastal Plain
44. Interior Low Plateau
45. North Central Tillplain
46. Prairie-Forest Border
47. Superior Mixed Forest
48. Great Lakes
49. Western Allegheny Plateau
50. Cumberlands and Southern Ridge and Valley
51. Southern Blue Ridge
52. Piedmont
53. East Gulf Coastal Plain
54. Tropical Florida
55. Florida Peninsula
56. South Atlantic Coastal Plain
57. Mid-Atlantic Coastal Plain
58. Chesapeake Bay Lowlands
59. Central Appalachian Forest
60. High Allegheny Plateau
61. Lower New England/Northern Piedmont
62. North Atlantic Coast
63. Northern Appalachian/Boreal Forest



FIGURE 1-2. Gulf Coastal Plain Ecosystem Partnership lands and surrounding landscape in the far western Florida Panhandle and southern Alabama, U.S.A. Lands marked in green are included in the seven member, public-private partnership that comprises nearly 840,000 acres.

# GULF COASTAL PLAIN ECOSYSTEM PARTNERSHIP



## CHAPTER 2. CONSERVATION FROM AN ECOREGIONAL PERSPECTIVE: THE BIODIVERSITY SIGNIFICANCE OF THE GULF COASTAL PLAIN ECOSYSTEM PARTNERSHIP

### **Report purpose**

The purposes of this chapter is to provide the Gulf Coastal Plain Ecosystem Partnership ("GCPEP") steering committee with:

- A summary of the overall significance of the 840,000 acre ownership of GCPEP in the context of the entire 42 million acre East Gulf Coastal Plain ecoregion;
- A list of suggested "conservation targets" (species only) that occur on GCPEP lands and waters that may benefit from individual and cooperative conservation efforts.

### **Ecoregional conservation & The Nature Conservancy**

During the 1990s, The Nature Conservancy ("TNC") began planning and working at larger geographic scales to conserve biodiversity. Toward this end, The Nature Conservancy adopted an "ecoregional conservation approach" (The Nature Conservancy 1997). Ecoregions are land areas that are large enough to encompass processes and multiple occurrences of rare and imperiled species and natural communities, yet small enough within which to plan, identify partners and take action. The U.S. ecoregional classification adopted by TNC is a modification of that adopted by the U.S. Forest Service (Bailey 1995).

The Nature Conservancy's conservation goal in each U.S. ecoregion is to work with willing partners to conserve multiple examples of all native community types and all native species in functioning landscapes. The Nature Conservancy clearly recognizes, as does the GCPEP, that this ambitious conservation goal will be achieved only to the extent that it is able to engage public and private partners in successful conservation initiatives. "Partnership" means finding common ground, seeking socially acceptable and scientifically credible solutions, and respecting the sometimes very different missions and goals of partners, including private land owners.

### **Conservation targets: Species and natural communities**

As a way of helping to focus the efforts of TNC staff and partners, TNC staff and partners developed a list of "conservation targets" for the East Gulf Coastal Plain ecoregion consistent with the methods used in other ecoregional planning efforts. Defining conservation targets is a critical first step in identifying the sites, goals and projects necessary for successful biodiversity conservation.

Conservation targets include:

1. All native plant communities and identifiable ecological complexes;
2. Species that are globally rare, imperiled or declining across their range or in the ecoregion; and

3. Other species or ecological features of conservation interest (e.g., species requiring large areas, keystone species, important breeding aggregations, etc.).

This emphasis on conservation targets reflects the “coarse filter–fine filter” (communities as coarse filter–species as fine filters) approach adopted by TNC and scientists in an effort to ensure that all species, not just those singled out for conservation action, are conserved within functioning ecological complexes in the landscapes where they occur. The resulting targets are derived from all available sources of biodiversity information including data from the Natural Heritage Network, published records, museum records, and consultation with biologists from public and private organizations and agencies. Development of conservation targets is considered by the Conservancy to be an iterative process and as new information is obtained, conservation targets and objectives will change.

### **Suggested species-level conservation targets for GCPEP**

The East Gulf Coastal Plain ecoregion (EGCP) covers 42,439,000 acres, stretching from northeastern Louisiana across the southern portions of Mississippi, Alabama, Georgia and western Florida (Figure 1-1; ecoregion number 53). The exceptional biological diversity in this ecoregion ranks it among the two or three richest in North America. Unfortunately, historical and current rates of habitat loss and alteration also make its biological resources among the most threatened. At the scale of the East Gulf Coastal Plain ecoregion, TNC identified 310 target species (148 vascular plants, 1 lichen, 73 invertebrates, 28 fishes, 12 amphibians, 20 reptiles, 15 birds, and 13 mammals) and 297 target natural communities that are considered to be rare, imperiled or of conservation concern (The Nature Conservancy, 1999).

The Gulf Coastal Plain Ecosystem Partnership<sup>5</sup> (GCPEP) consists of seven public and private partners that manage land in the south-central portion of the East Gulf Coastal Plain (Figure 1-2). In this report, we present lists of EGCP target species that have been recorded on each of the partnership lands (Blackwater River State Forest, Conecuh National Forest-Blue Springs Water Management Area, the Champion International Corporation connector parcel, Choctawhatchee River Delta Preserve, Choctawhatchee River Water Management Area, Eglin Air Force Base, Garcon Point Water Management Area, Lower Escambia River Water Management Area and Yellow River Water Management Area). Please note that this report focuses on species-level targets, and does not analyze or present findings on natural communities. Later reports will examine natural communities.

This list of suggested conservation targets represents TNC’s initial attempt to provide the GCPEP with a biodiversity perspective larger than any one ownership. The individual members of the GCPEP may have species-level targets that differ from the Conservancy’s or none at all. These lists represent conservation objectives for The Nature Conservancy staff only and in no way represent the conservation objectives of GCPEP. If adopted whole or in part, this list may

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<sup>5</sup> In 1995, the GCPEP was formalized by means of a MOU signed by each of the following partners: Eglin Air Force Base (463,441 acres), Florida Division of Forestry (189,374 acres), Northwest Florida Water Management District (97,781 acres), National Forests in Alabama (83,790 acres), Champion International Corporation (7,550 acres), The Nature Conservancy (2,750 acres), and National Forests in Florida (1,114 acres).

help GCPEP members collectively and individually focus their limited conservation resources on the highest conservation priorities from an ecoregional, national, and global perspective.

## Methods

To determine which EGCP target species have been recorded on each natural area managed by GCPEP, TNC staff and partners examined lists of rare and imperiled species recorded by the Florida Natural Areas Inventory, the Alabama Natural Heritage Program, and TNC's East Gulf Coastal Plain Ecoregional Planning Team. Additional occurrence data were obtained from other private, state and federal cooperators. The completeness of these lists may be limited by several factors. Species distributions presented here may understate the real distribution; it is probable that some species have escaped detection, especially in areas where little sampling has been performed. Additionally, due to a backlog of work at the natural heritage agencies, some natural occurrences of target species that have been observed in the field have yet to be documented in the computerized databases that we used. In contrast, some species recorded in the GCPEP landscape may no longer occur on some ownerships. However limited, these lists represent the most comprehensive data available at this writing.

## Summary of findings

Species-level targets. The GCPEP landscape is considered by The Nature Conservancy to be one of the two most important landscapes in the ecoregion and a critical link in conserving the biodiversity of the Southeastern U.S. While its area comprises less than 2% of the 47 million acre East Gulf Coastal Plain ecoregion, the GCPEP landscape includes 37% of the target species and 38% of the natural communities of the ecoregion. Of the 308 species of plants, animals and lichens that are considered EGCP target species by The Nature Conservancy, at least 115 have been recorded as occurring on GCPEP lands, including 51 vascular plants, one lichen, 26 invertebrates, 10 fishes, six amphibians, nine reptiles, five birds and seven mammals (Tables 2-1a,b,c). Eleven are listed as federally endangered or threatened, with many more that may be considered for future listing unless immediate conservation action is taken.

Tables 2.3–2.11 list the target species that are found at each managed area, including those that are unique or nearly unique to each. Many of the managed areas host endemic or near endemic species and communities, and thus have a unique role to play in conservation at landscape and ecoregional scales. Sixty-one of the target species occurring on GCPEP lands have Natural Heritage ranks of G1,G2, T1, or T2, meaning that they have extremely limited distributions from a global perspective. Forty-five do not occur outside of the East Gulf Coastal Plain ecoregion.

Of these, at least 20 occur only within the GCPEP managed areas, and nowhere else. For example, a small area overlapping Eglin Air Force Base and Champion International properties contains the entire known range of the Florida bog frog (*Rana okaloosae*), an endemic species and one of the rarest vertebrates in North America. Eglin AFB is home to another endemic vertebrate, the Okaloosa darter (*Etheostoma okaloosae*). Blackwater River State Forest, Eglin AFB and Choctawhatchee River Water Management Area all host endemic invertebrates. Global conservation of these species depends on conservation of their habitat on GCPEP managed areas.

The GCPEP lands include significant portions of the watersheds of the Escambia-Conecuh, Blackwater, Yellow-Shoal and Choctawhatchee rivers. A recent assessment of North American freshwater systems identified these four watersheds as important hotspots for protecting at-risk fish and mussels and critical for conserving freshwater biodiversity in the U.S. (The Nature Conservancy 1998). For example, of the nine freshwater mollusk target species found in GCPEP managed areas, eight are G1 or G2 species, and five are endemic to the watersheds of the GCPEP landscape. All five occur in the Choctawhatchee River; two of them (*Ptychobranchius jonesi* and *Quincuncuna burkei*) exclusively so, but three with disjunct distributions (*Pleurobema strodeanum* is also found within the Lower Escambia Water Management Area, while *Villosa australis* and *Villosa choctawensis* have also been found at Conecuh National Forest). There have been relatively few studies of these freshwater systems. Surveys currently underway are expected to reveal significant new findings, especially on the Alabama portions of each watershed.

The Gulf Coastal Plain Ecosystem Partnership also hosts numerous targets that are non-endemic yet of great conservation concern. Some of the more imperiled non-endemics include the federally endangered red-cockaded woodpecker (*Picoides borealis*), which occurs on three of the partner lands; the federally threatened gulf sturgeon (*Acipenser oxyrinchus desotoi*), found in five rivers managed by GCPEP partners; and the white-top pitcherplant (*Sarracenia leucophylla*), which has been found at eight partner lands. The presence of these species on multiple partner landholdings, including in some cases the movement of individuals among them (e.g., red-cockaded woodpeckers), suggests that many opportunities for cooperative conservation exists among GCPEP land managers, and in some cases, may be essential for the long-term persistence of a number of important species.

Natural community-level targets. In all, at least 115 natural communities are represented on GCPEP lands, representing at least 38% of the 297 types described for the ecoregion. Gulf Coastal Plain Ecosystem Partnership ownerships comprise perhaps the most important and largest ownerships of the remaining vestiges of the once vast longleaf pine ecosystem, ranging from xeric sandhills to coastal flatwoods, and including the largest remaining old-growth stands. The former longleaf pine ecosystem has declined by as much as 98% across its former range. Gulf Coastal Plain Ecosystem Partnership lands and waters include perhaps as much as 20–25% of the remaining large ownerships. But the GCPEP landscape includes far more than just longleaf pine-dominated ecological complexes. For example, GCPEP ownerships include some of the largest remaining and best examples of barrier island-beach complexes on the U.S. Gulf coast, and some very rare plant associations, such as *Chrysoma/Conradina* dwarf-shrubland and *Hypericum chapmanii* dome swamp. The importance of these lands in protecting natural communities and ecological complexes will become better understood with further documentation.

TABLE 3-1a. ECGP Target plant and lichen species recorded on GCPEP lands. A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	Federal listing	Partner Lands
<b>PLANTS</b>				
<i>Agalinis filicaulis</i>	Jackson false foxglove	G3G4	N	EAFB
<i>Aristida simpliciflora</i>	southern three-awned grass	G2	N	EAFB
<i>Arnoglossum diversifolium</i>	variable-leaved indian plantain	G2	N	CRWMA, EAFB
<i>Arnoglossum sulcatum</i>	indian plantain	G3G4	N	CONNf, EAFB
<i>Asclepias viridula</i>	southern milkweed	G2	N	EAFB
<i>Aster chapmanii</i>	Shimmer's aster	G2G3	N	EAFB
<i>Aster eryngiifolius</i>	coyote-thistle aster	G3?	N	CONNf, EAFB
<i>Baptisia calycosa</i> var <i>villosa</i> *	hairy wild indigo	G2T1T2	N	EAFB, CHAMP
<i>Calamintha dentata</i>	toothed savory	G3	N	EAFB
<i>Calamovilfa curtissii</i>	Curtiss' sandgrass	G2	N	CHONF, EAFB, Garcon Point W.M.A.,
<i>Carex baltzellii</i>	Baltzell's sedge	G2	N	EAFB
<i>Chrysopsis godfreyi</i>	Godfrey's golden aster	G2	N	EAFB
<i>Chrysopsis gossypina cruseana</i>	Cruise's golden aster	G5T2	N	EAFB
<i>Cladium mariscoides</i>	pond rush	G5	N	EAFB, GPWMA
<i>Coelorachis tuberculosa</i>	piedmont jointgrass	G3	N	BRSE, EAFB
<i>Eleocharis rostellata</i>	beaked spikerush	G5	N	EAFB
<i>Helianthemum arenicola</i> *	Gulf rockrose	G3	N	EAFB
<i>Hymenocallis henryae</i> *	panhandle spiderlily	G1Q	N	EAFB
<i>Juncus gymnocarpus</i>	naked-fruited rush	G4	N	CONNf, EAFB
<i>Lilium iridollae</i>	panhandle lily	G1G2	N	BRSE, CHAMP, CONNF, EAFB, YRWMA
<i>Lindera subcoriacea</i>	bog spicebush	G2	N	EAFB, CONNF
<i>Linum westii</i>	West's flax	G2	N	EAFB
<i>Ludwigia spathulata</i>	spatulate seedbox	G2G3	N	CONNf
<i>Lupinus westianus</i> var <i>westianus</i> *	Gulf Coast lupine	G2	N	EAFB, CHONF
<i>Macranthera flammea</i>	hummingbird flower	G3	N	BRSE, CONNF, EAFB
<i>Magnolia ashei</i>	Ashe's magnolia	G3	N	CRWMA, EAFB
<i>Matelea alabamensis</i>	Alabama spiny-pod	G1	N	EAFB

Scientific Name	Common Name	G-rank	Federal listing	Partner Lands
<i>Monotropa hypopithys</i>	pinemap	G5	N	EAFB
<i>Nuphar lutea</i> spp. <i>ulvacea</i>	west Florida cowlily	G5T2	N	CRWMA, EAFB, YRWMA
<i>Panicum nudicaule</i>	naked-stemmed panic grass	G3	N	CONNF, EAFB
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	BRSF, CHONF, CONNF, EAFB, GPWMA, YRWMA
<i>Pinguicula primuliflora</i>	primrose-flowered butterwort	G3G4	N	EAFB, CONNF
<i>Pityopsis oligantha</i>	coastal-plain golden-aster	G1G3	N	CONNF, EAFB
<i>Polygonella macrophylla</i>	large-leaved jointweed	G2	N	CHONF, EAFB
<i>Quercus arkansana</i>	Arkansas oak	G3	N	CHONF, EAFB
<i>Rhexia parviflora</i>	small-flowered meadowbeauty	G2	N	BRSF, EAFB
<i>Rhexia salicifolia</i>	panhandle meadowbeauty	G2	N	CONNF, EAFB
<i>Rhododendron austrinum</i>	orange azalea	G3	N	CHONF, CRWMA, CONNF, EAFB
<i>Rhynchospora crinipes</i>	hairy-peduncled beakrush	G1	N	EAFB
<i>Ruellia noctiflora</i>	night-flowering ruellia	G2G3	N	CONNF
<i>Sarracenia leucophylla</i>	white-top pitcherplant	G3	N	BRSF, CHAMP, CHONF, CONNF, EAFB, GPWMA, YRWMA
<i>Sarracenia purpurea</i>	purple pitcherplant	G5	N	EAFB
<i>Sarracenia rubra</i> ssp. <i>wherryi</i>	Wherry's sweet pitcher-plant	G3T3	N	CONNF, BRSF
<i>Schwalbea americana</i>	chaffseed	G2	LE	BRSF
<i>Selaginella ludoviciana</i>	Gulf spike moss	G3G4	N	EAFB
<i>Sideroxylon thornei</i>	Thorne's buckthorn	G2	N	EAFB
<i>Tephrosia mohrii</i>	pineland hoary-pea	G2?Q	N	EAFB
<i>Verbesina chapmanii</i>	Chapman's crownbeard	G2G3	N	EAFB
<i>Xyris chapmanii</i>	Chapman's yellow-eyed grass	G3	N	BRSF, CONNF
<i>Xyris isotifolia</i> *	quillwort yellow-eyed grass	G2?	N	CONNF
<i>Xyris longisepala</i>	Kral's yellow-eyed-grass	G2	N	CONNF
LICHENS				
<i>Cladonia perforata</i> *	perforate reindeer lichen	G1	LE	EAFB



**PARTNER LAND ABBREVIATIONS EXPLAINED:**

BRSF = Blackwater River State Forest  
CHAMP = Champion International Corporation Connector Parcel  
CONNF = Conecuh National Forest  
CRWMA = Choctawhatchee River Water Management Area  
CHONF = Choctawhatchee National Forest  
CRDP = Choctawhatchee River Delta Preserve  
EAFB = Eglin Air Force Base  
GPWMA = Garcon Point Water Management Area  
LERWMA = Lower Escambia River Water Management Area  
YRWMA = Yellow River Water Management Area

TABLE 2-1b. ECGP Target invertebrate species recorded on GCPEP lands. A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	Federal Listing	Partner Lands
<b>INSECTS</b>				
<i>Agarodes ziczac</i> **	Zigzag Blackwater River caddisfly	G1	N	BRSF
<i>Baetisca escambiensis</i> **	a mayfly	G1	N	BRSF
<i>Cernotina truncona</i>	Florida cernotinan caddisfly	G4G5	N	CONNF
<i>Cheumatopsyche gordonae</i> **	Gordon's little sister sedge (a caddisfly)	G1	N	EAFB
<i>Cheumatopsyche petersi</i> **	Peter's little sister sedge (a caddisfly)	G1	N	EAFB
<i>Cordulegaster sayi</i>	Say's spiketail	G1G2	N	BRSF, CONNF
<i>Gomphus westfalli</i>	diminutive clubtail	G1G2	N	BRSF
<i>Hydrotilla latosa</i> **	broad varicolored microcaddisfly	G1	N	EAFB
<i>Ochrotrichia okaloosa</i> **	Okaloosa somber microcaddisfly	G1	N	EAFB
<i>Oxyethira kelleyi</i> **	Kelley's cream brown microcaddisfly	G1	N	EAFB
<i>Polyamina pubescens</i> **	panhandle beach scarab	G2	N	EAFB
<b>MOLLUSKS</b>				
<i>Elimia clenchi</i> **	Clench's goniobasis	G1G2	N	CRWMA
<i>Elliptio mcMichaeli</i>	fluted elephantear	G3Q	N	CRWMA
<i>Fusconaia escambia</i>	narrow pigtoe	G2	N	LERWMA
<i>Lampsilis ornata</i>	southern pocketbook	G1?	N	LERWMA
<i>Lampsilis straminea claibornensis</i>	southern fatmucket	G5T5	N	CONNF
<i>Lepidostoma morsei</i>	Morse's little plain brown sedge	G1	N	EAFB
<i>Margaritifera marrianae</i>	Alabama pearlshell	G1	N	CONNF
<i>Oecetis morsei</i>	a caddisfly	G1	N	CONNF
<i>Pleurobema strodeanum</i>	fuzzy pigtoe	G2	N	CRWMA, LERWMA
<i>Polycentropus floridensis</i>	Florida brown checkered summer sedge	G2	N	EAFB
<i>Ptychobranchius jonesi</i>	southern kidney shell	G2	N	CRWMA, CONNF
<i>Quincuncina burkei</i> *	tapered pigtoe	G2	N	CRWMA
<i>Strophitus subvexus</i>	southern creekshell	G3	N	CONNF
<i>Villosa australis</i> *	southern sandshell	G2	N	CONNF, CRWMA
<i>Villosa choctawensis</i> *	choctaw bean	G2	N	CONNF, CRWMA

TABLE 2-1c. ECGP Target vertebrate species recorded on GCPEP lands. A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED listing	Partner Lands
<b>FISHES</b>				
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	LT	CONNF, CRWMA, CRDP, EAFB, LERWMA, YRWMA
<i>Alosa alabamiae</i>	Alabama shad	G4	N	CRWMA, LEWMA, YRWMA
<i>Etheostoma bifascia</i>	Florida sand darter	G3	N	CONNF
<i>Etheostoma davisoni</i>	Choctawhatchee darter	G3	N	CONNF
<i>Etheostoma okaloosae</i> **	Okaloosa darter	G2	LE	EAFB
<i>Etheostoma proleare</i>	cypress darter	G5	N	LERWMA
<i>Fundulus escambiae</i>	russetfin topminnow	G4	N	CONNF
<i>Fundulus jenkinsi</i>	saltmarsh topminnow	G3	N	GPWMA
<i>Macrhybopsis</i> sp. 2	Florida chub	G3	N	CRWMA, LERWMA
<i>Percina austroperca</i>	southern logperch	G3	N	LERWMA
<b>AMPHIBIANS</b>				
<i>Ambystoma cingulatum</i>	flatwoods salamander	G2G3	LT	EAFB, CHAMP, CONNF
<i>Ambystoma tigrinum</i>	tiger salamander	G5	N	BRSF
<i>Amphiuma pholeter</i>	one-toed amphiuma	G3	N	EAFB
<i>Hyla andersonii</i>	pine barrens treefrog	G4	N	BRSF, CONNF, EAFB
<i>Rana capito sevosa</i>	dusky gopher frog	G4T2	N	BRSF, CONNF, EAFB
<i>Rana okaloosae</i>	Florida bog frog	G2	N	CHAMP, EAFB
<b>REPTILES</b>				
<i>Caretta caretta</i>	loggerhead sea turtle	G3	LT	EAFB
<i>Chelonia mydas</i>	green sea turtle	G3	LE	EAFB
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake	G5	N	BRSF, CRWMA, EAFB, CONNF
<i>Drymarchon corais couperi</i>	eastern indigo snake	G4T3	LT	BRSF, EAFB, CONNF
<i>Gopherus polyphemus</i>	gopher tortoise	G3	LT	BRSF, CONNF, EAFB
<i>Graptemys ernsti</i>	Escambia map turtle	G2	N	EAFB, LERWMA, YRWMA

Scientific Name	Common Name	G-rank	FED listing	Partner Lands
<i>Heterodon simus</i>	southern hognose snake	G2	N	CONN, EAFB
<i>Macroclermys temminckii</i>	alligator snapping turtle	G3G4	N	BRSF, CRWMA, CONNF, EAFB, LERWMA, YRWMA
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	G5T3?	N	BRSF, CHAMP, CONNF, EAFB
<b>BIRDS</b>				
<i>Aimophila aestivalis</i>	Bachman's sparrow	G3	N	EAFB, CONNF, BRSF
<i>Charadrius alexandrinus</i>	snowy plover	G4	N	EAFB
<i>Falco sparverius paulus</i>	southeastern American kestrel	G5T3T4	N	EAFB
<i>Picoides borealis</i>	red-cockaded woodpecker	G3	LE	BRSF, CONNF, EAFB
<i>Speotyto cunicularia floridana</i> *	Florida burrowing owl	G4T3	N	EAFB
<b>MAMMALS</b>				
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	G3G4	N	CONN
<i>Myotis austroriparius</i>	southeastern myotis	G3G4	N	CONN
<i>Neotiber allenii</i>	round-tailed muskrat	G3	N	EAFB
<i>Peromyscus polionotus leucocephalus</i> *	Santa Rosa beach mouse	G5T1	N	EAFB
<i>Peromyscus polionotus peninsularis</i>	St. Andrews beach mouse	G5T1	N	EAFB
<i>Trichechus manatus</i>	manatee	G2?	LE	CRDP, CRWMA, EAFB, GPWMA, YRWMA
<i>Ursus americanus floridanus</i>	Florida black bear	G5T2	N	CHAMP, CONNF, EAFB

TABLE 2-2. ECGP Target species recorded at Blackwater River State Forest, Florida (as of April 1999). A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<b>PLANTS</b>							
<i>Coelorachis tuberculosa</i>	piedmont jointgrass	G3	N	S3	N	2	FNAI, 1999
<i>Lilium iridollae</i>	panhandle lily	G1G2	N	S1S2	LE	3	FNAI, 1999
<i>Macranthera flammea</i>	hummingbird flower	G3	N	S2	LE	4	FNAI, 1999
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	S2	LE	2	FNAI, 1999
<i>Rhexia parviflora</i>	small-flowered meadowbeauty	G2	N	S2	LE	2	FNAI, 1999
<i>Sarracenia leucophylla</i>	white-top pitcherplant	G3	N	S3	LE	38	FNAI, 1999
<i>Sarracenia rubra</i> spp. <i>wherryi</i>	Wherry's sweet pitcher plant	G3T3	?	?	?	?	Compton, pers. comm
<i>Schwalbea americana</i>	chaffseed	G2	LE	S1	LE	1	Obersholster, pers. comm.
<i>Xyris chapmanii</i>	Chapman's yellow-eyed grass	G3	N	S1	N	1	FNAI, 1999
<b>INSECTS</b>							
<i>Agarodes ziczac</i> **	zigzag Blackwater River caddisfly	G1	N	S?	N	?	Deyrup and Franz, 1994
<i>Baetisca escambiensis</i>	a mayfly	G1G2	N	S?	N		EGCP Team, 1999
<i>Cordulegaster sayi</i>	Say's spiketail	G1G2	N	S1S2	N	1	FNAI, 1999
<i>Gomphus westfalli</i>	diminutive clubtail	G1G2	N	S?	N	?	Deyrup & Franz, 1994
<b>AMPHIBIANS</b>							
<i>Ambystoma tigrinum</i>	tiger salamander	G5	N	S3	N	3	FNAI, 1999
<i>Hyla andersonii</i>	pine barrens treefrog	G4	N	S3	LS	31	FNAI, 1999
<i>Rana capito sevoa</i>	dusky gopher frog	G3	N	S3	LS	2	FNAI, 1999

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<b>BIRDS</b>							
<i>Aimophila aestivalis</i>	Bachman's sparrow	G3	N	S3	N	?	Sheehan, pers. comm.
<i>Picoides borealis</i>	red-cockaded Woodpecker	G3	LE	S2	LT	20	FNAI, 1999
<b>REPTILES</b>							
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake	G5	N	S3	N	2	FNAI, 1999
<i>Drymarchon corais couperi</i>	eastern indigo snake	G4T3	LT	S3	LT	2	FNAI, 1999
<i>Gopherus polyphemus</i>	gopher tortoise	G3	LT	S3	LS	10	FNAI, 1999
<i>Macrolemys temminckii</i>	alligator snapping turtle	G3G4	N	S3	LS	1	FNAI, 1999
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	G5T3?	N	S3	LS	2	FNAI, 1999

TABLE 2-3. ECGP Target species recorded at the Champion International connector parcel, Florida (as of April 1999). A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<b>PLANTS</b>							
<i>Baptisia calycosa</i> var <i>villosa</i> *	hairy wild indigo	G2T3	N	S3	LT	2	FNAI, 1999
<i>Lilium iridollae</i>	panhandle lily	G1G2	N	S1S2	LE	1	FNAI, 1999
<i>Sarracenia leucophylla</i>	white-top pitcherplant	G3	N	S3	LE	1	FNAI, 1999
<b>AMPHIBIANS</b>							
<i>Ambystoma cingulatum</i>	flatwoods salamander	G2G3	LT	S2S3	N	1	FNAI, 1999
<i>Rana okaloosae</i> *	Florida bog frog	G2	N	S2	LS	2	FNAI, 1999
<b>REPTILES</b>							
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	G5T3?	N	S3	LS	1	FNAI, 1999
<b>MAMMALS</b>							
<i>Ursus americanus floridanus</i>	Florida black bear	G5T2	N	S2	LT	?	LAAC and FNAI, 1992.

TABLE 2-4. EGCP Target species recorded at Choctawhatchee National Forest, Florida (as of April 1999). A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED	FNAI		# FNAI	Reference		
				Status	Rank			State	Locations
				Status	Rank			State	Locations
PLANTS									
<i>Calamovilfa curtissii</i>	Curtiss' sandgrass	G2	N	S3	LT	1	FNAI, 1999		
<i>Lupinus westianus</i> var <i>westianus</i> *	Gulf Coast lupine	G2	N	S2	LT	1	FNAI, 1999		
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	S2	LT	1	FNAI, 1999		
<i>Polygonella macrophylla</i>	large-leaved jointweed	G2	N	S2	LT	3	FNAI, 1999		
<i>Quercus arkansana</i>	Arkansas oak	G3	N	S3	N	2	FNAI, 1999		
<i>Rhododendron austrinum</i>	orange azalea	G3G4	N	S3	LE	1	FNAI, 1999		
<i>Sarracenia leucophylla</i>	white-top pitcherplant	G3	N	S3	LE	2	FNAI, 1999		



TABLE 2-5. EGCP Target species recorded at TNC's Choctawhatchee River Delta Preserve, Florida (as of April 1999)

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	References
<b>FISHES</b>							
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	LT	S2	LS	1	FNAI, 1999
<b>MAMMALS</b>							
<i>Trichechus manatus</i>	manatee	G2	LE	S2	LE	1	FNAI, 1999

TABLE 2-6. ECGP Target species recorded at the Choctawhatchee River Water Management Area, Florida (as of April 1999). A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	References
<b>PLANTS</b>							
<i>Arnoglossum diversifolium</i>	variable-leaved indian plantain	G2	N	S2	LT	2	FNAL, 1999
<i>Magnolia ashei</i>	Ashe's magnolia	G3	N	S2	LE	4	FNAL, 1999
<i>Nuphar lutea</i> spp. <i>ulvacea</i>	west Florida cowlily	G5T2	N	S2	N	1	FNAL, 1999
<i>Rhododendron austrinum</i>	orange azalea	G3G4	N	S3	LE	2	FNAL, 1999
<b>BIVALVE MOLLUSKS</b>							
<i>Elimia clenchi</i> **	Clench's goniobasis	G1G2	N	S1	N	7	FNAL, 1999
<i>Elliptio mcMichaeli</i>	fluted elephantear	G3Q	N	S1S2	N	9	FNAL, 1999
<i>Pleurobema strodeanum</i>	fuzzy pigtoe	G2	N	S?	N	1	FNAL, 1999
<i>Ptychobranchius jonesi</i>	southern kidney shell	G2	N	S1	N	3	FNAL, 1999
<i>Quincuncina burkei</i> **	tapered pigtoe	G2	N	S?	N	5	FNAL, 1999
<i>Villosa australis</i> *	southern sandshell	G2	N	S?	N	1	FNAL, 1999
<i>Villosa choctawensis</i> *	choctaw bean	G2	N	S1	N	7	FNAL, 1999
<b>FISHES</b>							
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	LT	S?	LS	1	FNAL, 1999
<i>Alosa alabamae</i>	Alabama shad	G4	N	S?	N	1	EGCP Team, 1999
<i>Macrhybopsis</i> sp. 2	Florida chub	G3	N	S2	N	2	FNAL, 1999
<b>REPTILES</b>							
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake	G5	N	S3	N	1	FNAL, 1999
<i>Macroclmys temminckii</i>	alligator snapping turtle	G3G4	N	S3	LS	1	FNAL, 1999
<b>MAMMALS</b>							
<i>Trichechus manatus</i>	manatee	G2?	LE	S2?	LE	1	FNAL, 1999

TABLE 2-7. EGCP Target species recorded at Conecuh National Forest, Alabama (as of April 1999). A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED Status	State Rank	State Status	# FNAI Recorded Locations	Reference
<b>PLANTS</b>							
<i>Arnoglossum sulcatum</i>	indian plantain	G3G4	N	S2S3	N	6	ALNHP, 1999
<i>Aster eryngiifolius</i>	coyote-thistle aster	G3?	N	S2	N	1	ALNHP, 1999
<i>Juncus gymnocarpus</i>	naked-fruited rush	G4	N	S1	N	2	ALNHP, 1999
<i>Lilium iridollae</i>	panhandle lily	G1G2	N	S1	N	4	ALNHP, 1999
<i>Lindera subcoriacea</i>	bog spicebush	G2	N	S1	N	2	ALNHP, 1999
<i>Ludwigia spathulata</i>	spatulate seedbox	G2G3	N	S1S2	N	1	ALNHP, 1999
<i>Macranthera flammea</i>	flame flower	G3	N	S2S3	N	4	ALNHP, 1999
<i>Panicum nudicaule</i>	naked-stemmed panic grass	G3	N	S2	N	8	ALNHP, 1999
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	S1S2	N	?	CONNF, 1999
<i>Pinguicula primuliflora</i>	primrose-flowered butterwort	G3G4	N	S3S4	N	1	ALNHP, 1999
<i>Pityopsis oligantha</i>	coastal-plain golden aster	G2G4	N	S?	N	7	ALNHP, 1999
<i>Rhexia salicifolia</i>	panhandle meadowbeauty	G2	N	S1	N	2	ALNHP, 1999
<i>Rhododendron austrinum</i>	orange azalea	G3	N	S2S3	N	4	ALNHP, 1999
<i>Ruellia noctiflora</i>	night-flowering ruellia	G2	N	S1	N	5	ALNHP, 1999
<i>Sarracenia leucophylla</i>	whitetop pitcher-plant	G3	N	S3	N	11	ALNHP, 1999
<i>Sarracenia rubra</i> ssp <i>wherryi</i>	Wherry's sweet pitcher-plant	G3T3	N	S3	N	1	ALNHP, 1999
<i>Xyris chapmanii</i>	Chapman's yellow-eyed grass	G3	N	S?	N	3	ALNHP, 1999
<i>Xyris isoetifolia</i> *	quillwort yellow-eyed grass	G2?	N	SR	N	?	CONNF, 1999
<i>Xyris longisepala</i>	Kral's yellow-eyed-grass	G2	N	S1	N	2	ALNHP, 1999
<b>BIVALVES</b>							
<i>Lampsilis straminea claibornensis</i>	southern fatmucket	G5T5	N	S3	N	3	ALNHP, 1999
<i>Margaritifera marrianae</i>	Alabama pearlshell	G1	N	S1S2	N	5	ALNHP, 1999
<i>Ptychobranchius jonesi</i>	southern kidneyshell	G2	N	S2	N	?	CONNF, 1999
<i>Strophitus subvexus</i>	southern creekshell	G3	N	S1	N	1	ALNHP, 1999
<i>Villosa australis</i>	Southern sandshell	G2	N	S1S2	N	2	ALNHP, 1999

Scientific Name	Common Name	G-rank	FED Status	State Rank	State Status	# FNAI Recorded Locations	Reference
<i>Villosa choctawensis</i>	Choctaw bean	G2	N	S2	N	2	ALNHP, 1999
<b>INSECTS</b>							
<i>Ceratomyxa truncon</i>	Florida cernotinan caddisfly	G4G5	N	S1	N	1	ALNHP, 1999
<i>Cordulegaster sayi</i>	Say's spiketail	G1G2	N	S?	N	?	CONNF, 1999
<b>FISHES</b>							
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	N	S1	N	1	ALNHP, 1999
<i>Alosa alabamae</i>	Alabama shad	G4	N	S2	N	1	ALNHP, 1999
<i>Etheostoma bifascia</i>	Florida sand darter	G3	N	S3	N	1	ALNHP, 1999
<i>Etheostoma davisoni</i>	Choctawhatchee darter	G3	N	S3	N	1	ALNHP, 1999
<i>Fundulus escambiae</i>	russetfin topminnow	G4	N	S3	N	1	ALNHP, 1999
<b>AMPHIBIANS</b>							
<i>Ambystoma cingulatum</i>	flatwoods salamander	G2G3	LT	S1	SP	???	CONNF, 1999
<i>Hyla andersonii</i>	pine barrens treefrog	G4	N	S2	SP	11	ALNHP, 1999
<i>Rana capito sevosa</i>	dusky gopher frog	G4T2	N	S2	SP	3	ALNHP, 1999
<b>BIRDS</b>							
<i>Aimophila aestivalis</i>	Bachman's sparrow	G3	N	S3	N		CONNF, 1999
<i>Picoides borealis</i>	red-cockaded woodpecker	G3	LE	S2	SP	1	ALNHP, 1999
<b>REPTILES</b>							
<i>Crotalus adamanteus</i>	diamondback rattlesnake	G4	N	S3	N	?	CONNF, 1999
<i>Drymarchon corais couperi</i>	eastern indigo snake	G4T3	LT	S1	SP	?	CONNF, 1999
<i>Gopherus polyphemus</i>	gopher tortoise	G3	LT	S2	SP	?	CONNF, 1999
<i>Graptemys ernsti</i>	Escambia map turtle	G2	N	S2	N	2	ALNHP, 1999
<i>Heterodon simus</i>	southern hognose snake	G2	N	SH	SP	2	ALNHP, 1999
<i>Macroclermys temminckii</i>	alligator snapping turtle	G3G4	N	S3	SP	1	ALNHP, 1999
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	G5T3?	N	S2	SP	3	ALNHP, 1999

Scientific Name	Common Name	G-rank	FED Status	State Rank	State Status	# FNAI Recorded Locations	Reference
<b>MAMMALS</b>							
<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	G3G4	N	S2	SP	?	CONNF, 1999
<i>Myotis austroriparius</i>	southeastern myotis	G3G4	N	S2	SP	1	ALNHP, 1999
<i>Ursus americanus floridanus</i>	Florida black bear	G5T2	N	S2	N	1	ALNHP, 1999

TABLE 2-8. EGCP Target species recorded at Eglin Air Force Base (as of April 1999). A single asterisk follows names of species that are endemic to the GCPEP landscape, while two asterisks follow those endemic to a single GCPEP site.

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<b>PLANTS</b>							
<i>Agalinis filicaulis</i>	Jackson false foxglove	G3G4	N	S3	N	?	EGCP Team, 1999
<i>Arnoglossum diversifolium</i>	variable-leaved indian plantain	G2	N	S2	LT	?	Kindell et al., 1997
<i>Arnoglossum sulcatum</i>	indian plantain	G3G4	N	S?	N	?	EGCP Team, 1999
<i>Aristida simpliciflora</i>	southern three-awned grass	G2	N	S2	N	2	FNAI, 1999
<i>Asclepias viridula</i>	southern milkweed	G2	N	S2	LT	2	FNAI, 1999
<i>Aster chapmanii</i>	Shinner's aster	G2G3	N	S2S3	?	2	FNAI, 1999
<i>Aster eryngiifolius</i>	snakeroot	G3?	N	S2S3	?	15	FNAI, 1999
<i>Baptisia calycosa</i> var <i>villosa</i> *	hairy wild indigo	G2T3	N	S1S2	LT	195	FNAI, 1999
<i>Calamintha dentata</i>	toothed savory	G3	N	S3	N	14	FNAI, 1999
<i>Calamovilfa curtissii</i>	Curtiss' sandgrass	G2	N	S3	LT	61	FNAI, 1999
<i>Carex baltzellii</i>	Baltzell's sedge	G2	N	S2	LT	90	FNAI, 1999
<i>Chrysopsis godfreyi</i>	Godfrey's golden aster	G2	N	S2	N	11	FNAI, 1999
<i>Chrysopsis gossypina cruseana</i>	Cruise's golden aster	G5T2	N	S2	LE	33	FNAI, 1999
<i>Cladium mariscoides</i>	pond rush	G5	N	S1	N	3	FNAI, 1999
<i>Coelorachis tuberculosa</i>	piedmont jointgrass	G3	N	S3	N	5	FNAI, 1999
<i>Eleocharis rostellata</i>	beaked spikerush	G5	N	S1	LE	1	FNAI, 1999
<i>Helianthemum arenicola</i> *	Gulf rockrose	G3	N	S3	?	19	FNAI, 1999
<i>Hymenocallis henryae</i> *	panhandle spiderlily	G1Q	N	S1	LE	1	FNAI, 1999
<i>Juncus gymnocarpus</i>	naked-fruited rush	G4	N	S1	N	3	FNAI, 1999
<i>Lilium iridollae</i>	panhandle lily	G1G2	N	S1S2	LE	39	FNAI, 1999
<i>Lindera subcoriacea</i>	bog spicebush	G2	N	S1	LE	3	FNAI, 1999
<i>Linum westii</i>	West's flax	G2	N	S2	LE	2	FNAI, 1999
<i>Lupinus westianus</i> var <i>westianus</i> *	Gulf Coast lupine	G2	N	S2	LT	1	FNAI, 1999
<i>Macranthera flammea</i>	hummingbird flower	G3	N	S2	LE	5	FNAI, 1999
<i>Magnolia ashei</i>	Ashe's magnolia	G3	N	S2	LE	31	FNAI, 1999
<i>Matelea alabamensis</i>	Alabama spiny-pod	G1	N	S1	LE	20	FNAI, 1999
<i>Monotropa hypopithys</i>	pinemap	G5	N	S1	LE	3	FNAI, 1999

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<i>Nuphar lutea</i> ssp <i>ulvacea</i>	west Florida cowlily	G5T2	N	S2	N	26	FNAL, 1999
<i>Panicum nudicaule</i>	naked-stemmed panic grass	G3?	N	S2?	N	69	FNAL, 1999
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	S2	LT	53	FNAL, 1999
<i>Pinguicula primuliflora</i>	primrose-flowered butterwort	G3G4	N	S3	LE	2	FNAL, 1999
<i>Pityopsis oligantha</i>	coastal plain golden aster	G1G3	N	S?	N	?	Kindell et al., 1997
<i>Polygonella macrophylla</i>	large-leaved jointweed	G2	N	S2	LT	23	FNAL, 1999
<i>Quercus arkansana</i>	Arkansas oak	G3	N	S3	N	144	FNAL, 1999
<i>Rhexia parviflora</i>	small-flowered meadowbeauty	G2	N	S2	LE	10	FNAL, 1999
<i>Rhexia salicifolia</i>	panhandle meadowbeauty	G2	N	S2	N	23	FNAL, 1999
<i>Rhododendron austrinum</i>	orange azalea	G3G4	N	S3	LE	23	FNAL, 1999
<i>Rhynchospora crinipes</i>	hairy-peduncled beakrush	G1	N	S1	N	12	FNAL, 1999
<i>Sarracenia leucophylla</i>	white-top pitcherplant	G3	N	S3	LE	131	FNAL, 1999
<i>Sarracenia purpurea</i>	purple pitcherplant	G5	N	S3	LT	2	FNAL, 1999
<i>Selaginella ludoviciana</i>	Gulf spike moss	G3G4	N	S?	N	?	EGCP Team, 1999
<i>Sideroxylon thornei</i>	Thorne's buckthorn	G2	N	S1	LE	1	FNAL, 1999
<i>Tephrosia mohrii</i>	pineland hoary-pea	G2?Q	N	S1	N	160	FNAL, 1999
<i>Verbesina chapmanii</i>	Chapman's crownbeard	G2G3	N	S2S3	LT	209	EGCP Team, 1999
<i>Xyris longisepala</i>	karst pond xyris	G2	N	S2	LE	15	FNAL, 1999
LICHEN							
<i>Cladonia perforata</i> *	perforate reindeer lichen	G1	LE	S1	LE	7	FNAL, 1999
INSECTS							
<i>Cheumatopsyche gordonae</i> **	Gordon's little sister sedge	G1	N	S?	N	?	Deyrup and Franz, 1994
<i>Cheumatopsyche petersi</i> **	Peter's little sister sedge	G2	N	S1	N	?	Flowers, 1997
<i>Hydrotilla latosa</i> **	broad varicolored microcaddisfly	G1	N	S?	N	?	Deyrup and Franz, 1994
<i>Lepidostoma morse</i> **i	Morse's little plain brown sedge	G1	N	S?	N	?	EGCP Team, 1999

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<i>Ochrotrichia okaloosa</i> **	Okaloosa somber microcaddisfly	G1	N	S?	N	?	Deyrup and Franz, 1994
<i>Oecietis morsei</i>	a caddisfly	G1	N	S?	N	?	EGCP Team, 1999
<i>Oxyrethira kelleyi</i> **	Kelly's cream and brown microcaddisfly	G1	N	S?	N	?	Deyrup and Franz, 1994
<i>Polycentropus floridensis</i>	Florida brown checkered summer sedge	G2	N	S?	N	?	EGCP Team, 1999
<i>Polylamina pubescens</i> **	panhandle beach scarab	G2	N	S?	N	?	Flowers, 1997
FISHES							
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	LT	S2	LS	2	FNAL, 1999
<i>Etheostoma okaloosae</i> **	Okaloosa darter	G2	LE	S2	LE	6	FNAL, 1999
AMPHIBIANS							
<i>Ambystoma cingulatum</i>	flatwoods salamander	G2G3	LT	S2S3	N	3	FNAL, 1999
<i>Amphiuma pholeter</i>	one-toed amphiuma	G3	N	S3	N	3	FNAL, 1999
<i>Hyla andersonii</i>	pine barrens treefrog	G4	N	S3	LS	53	FNAL, 1999
<i>Rana capito sevosa</i>	dusky gopher frog	G3	N	S3	LS	13	FNAL, 1999
<i>Rana okaloosae</i> *	Florida bog frog	G2	N	S2	LS	17	FNAL, 1999
REPTILES							
<i>Caretta caretta</i>	loggerhead	G3	LT	S3	LT	1	FNAL, 1999
<i>Chelonia mydas</i>	green turtle	G3	LT	S2	LE	1	FNAL, 1999
<i>Crotalus adamanteus</i>	eastern diamondback rattlesnake	G5	N	S3	N	24	FNAL, 1999
<i>Drymarchon corais couperi</i>	eastern indigo snake	G4T3	LT	S3	LT	16	FNAL, 1999
<i>Gopherus polyphemus</i>	gopher tortoise	G3	LT	S3	LS	26	FNAL, 1999
<i>Graptemys ernsti</i>	Escambia map turtle	G2	N	S2	N	1	FNAL, 1999
<i>Heterodon simus</i>	southern hognose snake	G2	N	S?	N	4	FNAL, 1999
<i>Macrolemys temminckii</i>	alligator snapping turtle	G3G4	N	S3	LS	3	FNAL, 1999
<i>Pituophis melanoleucus mugitus</i>	Florida pine snake	G5T3?	N	S3	LS	14	FNAL, 1999



Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<b>BIRDS</b>							
<i>Aimophila aestivalis</i>	Bachman's sparrow	G3	N	S3	N	10	FNAL, 1999
<i>Charadrius alexandrinus</i>	snowy plover	G4	N	S2	LT	1	FNAL, 1999
<i>Falco sparverius paulus</i>	southeastern American kestrel	G5T3T4	N	S3?	LT	3	FNAL, 1999
<i>Picoides borealis</i>	red-cockaded woodpecker	G3	LE	S2	LT	22	FNAL, 1999
<i>Speotyto cunicularia floridana</i>	Florida burrowing owl	G4T3	N	S3	LS	3	FNAL, 1999
<b>MAMMALS</b>							
<i>Neofiber alleni</i>	round-tailed muskrat	G3	N	S3	N	27	EGCP Team, 1999
<i>Peromyscus polionotus</i>	Santa Rosa beach mouse	G5T1	N	S1	N	2	FNAL, 1999
<i>leucocephalus*</i>							
<i>Peromyscus polionotus peninsularis</i>	St. Andrews beach mouse	G5T1	N	S1	LE	?	FNAL, 1999
<i>Trichechus manatus</i>	manatee	G2?	LE	S2?	LE	1	FNAL, 1999
<i>Ursus americanus floridanus</i>	Florida black bear	G5T2	N	S2	LT	2	FNAL, 1999

TABLE 2-9. EGCP Target species recorded at Garcon Point Water Management Area, Florida (as of April 1999)

Scientific Name	Common Name	G-rank		FNAI		# FNAI		Reference
		FED	Status	State	Rank	State	Locations	
PLANTS								
<i>Calamovilfa curtissii</i>	Curtiss's sandgrass	G2	N	S2	LE	5		FNAL, 1999
<i>Cladium mariscoides</i>	pond rush	G5	N	S1	N	1		FNAL, 1999
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	S2	LE	2		FNAL, 1999
<i>Sarracenia leucophylla</i>	white-top pitcher plant	G3	N	S3	LE	2		FNAL, 1999
FISHES								
<i>Fundulus jenkinsi</i>	saltmarsh topminnow	G3	N	S2	LS	1		FNAL, 1999
MAMMALS								
<i>Trichechus manatus</i>	manatee	G2?	LE	S2?	LE	1		FNAL, 1999

TABLE 2-10. EGCP Target species recorded at Lower Escambia Water Management Area (as of April 1999)

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	# FNAI Recorded Locations	Reference
<b>BIVALVE MOLLUSKS</b>						
<i>Fusconaia escambia</i>	narrow pigtoe	G2	N	S?	4	FNAI, 1999
<i>Lampsilis ornata</i>	southern pocketbook	G1?	N	S1	2	FNAI, 1999
<i>Pleurobema strodeanum</i>	fuzzy pigtoe	G2	N	S?	1	FNAI, 1999
<b>FISHES</b>						
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T2	LT	S?	1	FNAI, 1999
<i>Alosa alabamae</i>	Alabama shad	G4	N	S?	1	EGCP Team, 1999
<i>Etheostoma proeliare</i>	cypress darter	G5	N	S2	4	FNAI, 1999
<i>Macrhybopsis</i> sp. 2	Florida chub	G3	N	S2	3	FNAI, 1999
<i>Percina austroperca</i>	southern logperch	G3	N	S2	1	FNAI, 1999
<b>REPTILES</b>						
<i>Graptemys ernsti</i>	Escambia map turtle	G2	N	S2	1	FNAI, 1999
<i>Macroclermys temminckii</i>	alligator snapping turtle	G3G4	N	S3	1	FNAI, 1999

TABLE 2-11. EGCP Target species recorded at Yellow River Water Management Area, Florida (as of April 1999)

Scientific Name	Common Name	G-rank	FED Status	FNAI State Rank	State Status	# FNAI Recorded Locations	Reference
<b>PLANTS</b>							
<i>Lilium iridollae</i>	panhandle lily	G1G2	N	S1S2	LE	1	FNAI, 1999
<i>Nuphar lutea</i> spp. <i>ulvacea</i>	west Florida cowlily	G5T2	N	S2	N	2	FNAI, 1999
<i>Pinguicula planifolia</i>	Chapman's butterwort	G3?	N	S2	LT	1	FNAI, 1999
<i>Sarracenia leucophylla</i>	white-top pitcherplant	G3	N	S3	LE	1	FNAI, 1999
<b>FISHES</b>							
<i>Acipenser oxyrinchus desotoi</i>	Gulf sturgeon	G3T1T3	LE	S?	LE	1	FNAI, 1999
<i>Alosa alabamiae</i>	Alabama Shad	G4	N	S?	N	0	EGCP Team, 1999
<b>REPTILES</b>							
<i>Graptemys ernsti</i>	Escambia map turtle	G2	N	S2	N	1	FNAI, 1999
<i>Macroclermys temminckii</i>	alligator snapping turtle	G3G4	N	S3	LS	1	FNAI, 1999
<b>MAMMALS</b>							
<i>Trichechus manatus</i>	manatee	G2?	LE	S2?	LE	1	FNAI, 1999

## Explanation of global and state ranks

Explanations and definitions of FNAI global rank, FNAI state rank, federal status, and state status (taken from Marois, 1998, with the permission of the author). The Nature Conservancy and the Natural Heritage Program network (of which FNAI is a part) define an *element* as any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An *element occurrence* (EO) is a single extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

Using a ranking system developed by The Nature Conservancy and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks to each element. The *global rank* is based on an element's worldwide status; the *state rank* is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected EOs, relative threat of destruction, and ecological fragility.

Federal and State Status information is from the following sources:

- Federal animals and plants - U.S. Fish and Wildlife Service, October 31, 1997, *Endangered and Threatened Wildlife and Plants*, 50 CFR 17.11 and 17.12,
- State animals - Florida Game and Fresh Water Fish Commission, August 1, 1997, *Florida's Endangered Species and Species of Special Concern, Official Lists*
- State plants - Coile, N. C. 1998. Notes on the Florida's Regulated Plant Index, Rule 5B-40. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

## FNAI global rank definitions

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

G4 = Apparently secure globally (may be rare in parts of range)

G5 = Demonstrably secure globally

GH = Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)

GX = Believed to be extinct throughout range

GXC = Extirpated from the wild but still known from captivity or cultivation

G#? = Tentative rank (e.g., G2?)

- G#G# = Range of rank; insufficient data to assign specific global rank (e.g., G2G3)  
G#T# = Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)  
G#Q = Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)  
G#T#Q = Same as above, but validity as subspecies or variety is questioned.  
GU = Due to lack of information, no rank or range can be assigned (e.g., GUT2).  
G? = Not yet ranked (temporary)

FNAI state rank definitions

- S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.  
S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.  
S3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.  
S4 = Apparently secure in Florida (may be rare in parts of range)  
S5 = Demonstrably secure in Florida  
SH = Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)  
SX = Believed to be extinct throughout range  
SA = Accidental in Florida, i.e., not part of the established biota  
SE = An exotic species established in Florida may be native elsewhere in North America  
SN = Regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine

Federal legal status (Listed by the U. S. Fish and Wildlife Service - USFWS)

- LE = Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.  
PE = Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.  
LT = Listed as Threatened Species. Defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.  
PT = Proposed for listing as Threatened Species.  
C = Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on

file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.

E(S/A) = Endangered due to similarity of appearance.

T(S/A) = Threatened due to similarity of appearance.

N = Not currently listed, nor currently being considered for addition to the List of endangered and Threatened Wildlife and Plants.

### State Legal Status

- *Animals* (Listed by the Florida Game and Fresh Water Fish Commission - FGFWFC)

LE = Listed as Endangered Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.

LT = Listed as Threatened Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

LS = Listed as Species of Special Concern by the FGFWFC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species.

N = Not currently listed, nor currently being considered for listing.

- *Plants* (Listed by the Florida Department of Agriculture and Consumer Services - FDACS)

LE = Listed as Endangered Plants in the Preservation of Native Flora of Florida Act.

Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.

LT = Listed as Threatened Plants in the Preservation of Native Flora of Florida Act.

Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

N = Not currently listed, nor currently being considered for listing.

- *Special animal listings - state and federal status*
  - *Grus americana* (whooping crane) - Federally listed as XN (nonessential experimental population) which refers to the Florida experimental population only; Federal listing elsewhere is LE.
  - *Pandion haliaetus* (osprey) - State listed as LS (Species of Special Concern) in Monroe county only; not listed in rest of state.
  - *Mustela vison mink* pop (southern mink, S. Florida population) - State listed as LT (Threatened) which refers to the Everglades population only; species formerly listed as *Mustela vison evergladensis*.
  - *Ursus americanus floridanus* (Florida black bear) - State listed as LT but not applicable in Baker and Columbia counties or the Apalachicola National Forest.



## CHAPTER 3. SOCIOECONOMIC ASSESSMENT OF THE GULF COASTAL PLAIN ECOSYSTEM PARTNERSHIP LANDSCAPE

### Introduction

The partner institutions of the Gulf Coastal Plain Ecosystem Partnership ("GCPEP") are responsible for the management of 840,000 acres in western Florida and southern Alabama. Approximately 97% of this acreage occurs in three Alabama counties (Conecuh, Covington and Escambia) and four Florida counties (Escambia, Okaloosa, Santa Rosa and Walton). A socioeconomic analysis of this seven-county region was performed by reviewing statistical abstracts, public documents and internet sites that provide socioeconomic data. Socioeconomic conditions of the region as a whole, and also important intra-regional differences, are discussed in the following summary.

Major differences among counties and groups of counties exist. Knowledge of differences and similarities among counties will:

- Assist the GCPEP in understanding the socioeconomic forces shaping the region;
- Offer insight into future trends;
- Identify viable opportunities for cooperation among cities, towns and local governments, as well as identify divisive issues.

### Regional analysis

Population & demographics. Between 1990 and 1997, the population of this seven county region increased by 88,519 or 14.7%; a rate greater than 1980s growth (U.S. Bureau of the Census 1998). Population growth occurred primarily in the four Florida counties. The populations of Santa Rosa, Walton and Okaloosa counties grew at faster rates than the state and the nation during those years. Santa Rosa and Walton counties were two of the fastest growing counties in the nation, with growth rates of 40.3 % and 36.6%, respectively. Escambia County, FL grew by 7.5%, slower than the state of Florida rate of 13.3%, and experienced a negative net migration. Populations of the region's three Alabama counties grew much more slowly than Alabama as a whole and the nation. For example, the population of Conecuh County grew by only 0.2% between 1990 and 1997.

During the 1990s, people moved into the region at an unprecedented rate. Nearly half of the population growth (47%) in this region between 1990 and 1995 was due to immigration. However, Conecuh County, AL and Escambia County, FL actually experienced negative net migrations during those years (U.S. Bureau of the Census 1997).

Ethnic background of the region's residents in 1990 was 82% white, 15% black, 1.8% Hispanic, and smaller percentages for Native Americans/Eskimos/Aleutians, and Asians/Pacific Islanders. These data are virtually unchanged from those of 1980, and fairly closely match national figures, except for the small percentage of persons of Hispanic origin. Strong inter-county variation exists. Escambia and Conecuh Counties, Alabama, have high percentages of

blacks (28.1 and 42.2%, respectively) in the population compared to Alabama or Florida as a whole. In contrast, blacks are underrepresented (relative to Florida or Alabama) in Covington County, Alabama (13.1%) and three of the four Florida counties (Santa Rosa, Okaloosa and Walton) (4.0%, 9.0%, 6.6%), respectively (U.S. Bureau of the Census 1997).

Land use. The seven county region consists mainly of forested land. In 1995, 72% of the 2.4 million acres of the four Florida counties were classified as timberland, and 1% were woodland (forest too low in quality for economical production). Although increasing human population in the area sometimes leads to reduction of forested land, the amount of timberland in the Florida sub-region increased by 2% between 1987 and 1995 (Brown 1988, 1996). The most recent publications show that the Alabama sub-region had similar percentages of timberland (Vissage & Miller 1991) as of 1990. Patterns of ownership differed between the Alabama and Florida counties as of 1990. Forestry corporations own 45% of the timber in the Alabama counties, but only 25% in the Florida counties (Vissage & Miller 1991).

Farmland in the region, comprising 15% of the land, is being converted to other uses at a high rate. Between 1978 and 1992, the number of farms and farm acreage decreased by 25% and 29%, respectively (U.S. Bureau of Census 1996).

In the four Florida counties, the rate of residential development increased greatly between the late 1980s and the mid-1990s. For example, 377 housing units were constructed in Escambia County, FL in 1989 and 1990, while 3391 were constructed there in 1994 and 1995, a nine-fold increase. Okaloosa, Santa Rosa, and Walton counties all experienced two-fold increases in annual housing unit construction over the same period (Bureau of Economic and Business Research 1991, 1997). With this increase in construction, there has been a large increase in the acreage of residential land (from 9.38% of land area to 12.06%). For example, between 1990 and 1998, Santa Rosa County experienced a 28% increase in residential property, so that by 1998, 12% of the county's land was residential. Other land uses showing increases were commercial acreage (14% increase) and industrial acreage (11% increase), while the acreage of vacant lands and agricultural property have decreased (Santa Rosa County Community Planning 1998).

The rate of residential development in the three Alabama counties was slow as of the mid-1990s (Center for Business and Economic Research 1997). In 1994 and 1995, permits were issued for the construction of 126 new residential buildings, with 234 housing units, in all three Alabama counties combined. This figure is paltry compared to the permits issued for 15,000 units in the four Florida counties during those years.

Employment & economic performance. The counties of western Florida have had a very robust job market during the last two decades:

- The employed labor force increased by 66,000 between 1980 and 1990, and job growth occurred in every major employment sector except mining (U.S. Bureau of the Census 1996).
- Rapid growth in the number of jobs has continued in the 1990s. The county with the greatest increase was Okaloosa, with a 19.4% increase between 1992 and 1998 (Haas Center for Business Research and Economic Development 1999).

- The unemployment rate declined from 6.7% in 1990, to 5.2% in 1994, to 4.8% in 1998, and to less than 4% in March 1999 (Haas Center for Business Research and Economic Development 1999).
- The unemployment rate in the Florida counties has been consistently lower than state and national averages between 1991 and 1999 (U.S. Bureau of Labor Statistics 1999).

Employment problems do exist in the Florida sub-region. The industrial sector, which is typically a source of moderate income jobs, has done poorly in western Florida relative to the rest of Florida and the nation. The number of industrial jobs has declined in this region faster than the rate for the nation, and is below the national figure. Many of the newly created jobs are low paying, which has long been characteristic of jobs in these counties (as well as for the Alabama counties) (Hawkins and Kastro 1999).

Significant job growth did not occur in the three Alabama counties between 1980 and 1990 (U.S. Bureau of the Census 1996). Slight growth has occurred during the 1990s, and March 1999 unemployment rates in these counties were down to ~6.5% (Bureau of Labor Statistics 1999).

The three most important employment sectors in the region as of 1990 were technical, sales and administrative support (31%), wholesale/retail trade (23%) and manufacturing (13%) and the military (9%) (U.S. Bureau of the Census 1996). The military is an extremely important employer in Florida's three westernmost counties, the economies of which would be seriously hurt by substantial military downsizing in the area. The military is not a major source of employment in Walton County, Florida or in the three Alabama counties.

Only 2.3% of the employed civilian labor force worked in agriculture, forestry or fisheries in 1990. This percentage is relatively unchanged since 1980 (2.4%). Four employment sectors that grew especially quickly during the 1980s and 1990s were technical, sales and administrative support (nearly 25,000 jobs), wholesale/retail trade (17,000 jobs), tourism and construction (5,000 jobs) (U.S. Bureau of the Census 1996; Haas Center for Business Research and Economic Development 1999).

The tourism industry in the four Florida counties is extremely important, and continues to grow, as indicated by a 4.9% increase in bed tax revenues over last year. The funds from the bed tax revenues are used for local development projects, thereby benefiting the tourism industry (CBRED 1999). An increase in bridge traffic to the beaches of nearly 10% over last year also points to a rise in tourism. Tourism is a relative non-factor in the three Alabama counties.

As of 1993, per capita incomes in the Alabama counties and Walton County, Florida were low (approximately \$14,000) compared to those for Alabama, Florida and the nation. Per capita incomes in Escambia, Santa Rosa and Okaloosa counties in Florida (\$16,899, \$16,556 and \$18,202, respectively) were substantially higher than those in the three Alabama counties and Walton Co., FL, but were lower than the values for Alabama, Florida and the nation.

Compared to national standards, cost of living is relatively low, in large part due to the inexpensive housing (Haas Center for Business Research and Economic Development 1999). Prices of housing and commodities are only slightly lower in the western Florida counties than in the nation as a whole, even though incomes are about 20% lower (Hawkins and Kastro 1999).

Recent data on cost of living in the Alabama counties was not available. We assume that it is lower than in western Florida, but that it is not low enough to compensate for the very low income levels of the area.

**Social conditions.** The residents of the three Alabama counties are relatively uneducated and poor, relative to national levels. As of 1995, only 57.6% were high school graduates, and 8.1% were college graduates. The poverty rate, measured most recently in 1989, was 26%, having increased from 22% in 1979.

The residents of the Florida counties are better educated and wealthier than their counterparts in Alabama, but compare poorly to national levels. In 1995, 78% of Florida county residents were high school graduates, and 18.7% were college graduates. In 1989, the poverty rate was 15%, (it had been 16% in 1979) (U.S. Bureau of the Census 1997). Significant economic differences were present in the region in 1990. The year 2000 Census is likely to show evidence of the same problems. The poverty rate for blacks (39.7%) was much higher than that for whites (12.0%). The poverty rate for children, at 23.5%, is higher than that for adults (U.S. Bureau of the Census 1997).

**Citizen conservation attitudes.** Substantial data regarding the attitudes of the citizens of this region toward conservation issues does not exist. However, one indicator is the voting record for the citizens of the four Florida counties on Constitutional Revision No. 5 (Conservation of Natural Resources and Creation of Fish and Wildlife Conservation Commission). Seventy two percent of the voters in Florida passed Revision No. 5. The percent of voters in the four Florida counties in this region that voted to pass it was considerably lower. In Escambia 62.2% voted yes, in Santa Rosa 57.1%, in Okaloosa 50.9% and in Walton only 47.3% voted yes.

**Intra-county variation.** Land-use and socioeconomic patterns vary among and within counties in the region. For example, a higher percentage of rural inhabitants than suburban or urban inhabitants have jobs in agriculture and forestry. The Florida counties of the region of interest have marked local variation that is likely to have consequences for implementation of conservation and planning efforts in the region. The southern portions of the four Florida counties are coastal or near the coast. The population and economic power of coastal Florida is much greater than that of the rural northern portions, leading to differences in personal income, unemployment rate (Hawkins and Kastro 1999) and property values. Such differences have led to strife in county commission politics, and may hinder community planning and conservation efforts at the county level (V. Compton, personal comment).

### **Summary of findings**

Between 1990-1997, the seven county area in Florida and Alabama increased by nearly 15%. The majority of the growth occurred in the four Florida counties. Santa Rosa (40.3%) and Okaloosa (36.6%) were among the fastest growing counties in the country, while the three Alabama counties experienced little growth. Most of the growth (nearly half) was due to immigration. The region is predominately white (82%), but Escambia and Conecuh counties in Alabama have large black populations (28.1% and 42.2%, respectively).

Timberland is the predominant land use (72%) and between 1987 and 1995, timberland remained relatively stable, increasing by 2%. Forestry corporations own 45% of the timber in the

Alabama counties, but only 25% in the Florida counties. Farmland, however, decreased by 29% during the same period. Much of this decrease was due to residential development, especially in the fast growing Okaloosa, Santa Rosa and Walton counties of Florida. By 1998, 12% of the land area was classified as residential. Alabama counties showed relatively slow residential growth during a similar period.

Employment and job growth increased significantly in the Florida counties during the 1980s and 1990s, with job growth particularly strong in the technical, sales, administrative support, wholesale/retail trade and manufacturing. The majority of the new jobs are in the low paying service sector. Alabama experienced job growth, but at slower rates. In all cases, unemployment rates have generally declined over the past five to eight years (<4% in Florida and ~6.5% in Alabama). Employment in tourism is a growing and important economic force in the Florida counties, owing to their outstanding coastal beaches and bays.

Per capita incomes in the region were lower than national averages (about 20%), but so were living expenses. Per capita incomes were substantially higher in Florida than in Alabama, with the three westernmost Florida counties having significantly higher average incomes.

Compared to national averages, both Florida and Alabama county residents were relatively less educated and are poorer than national averages. Large disparities exist among counties (e.g., Alabama residents are less educated and are poorer than Florida residents) and racial groups (e.g., blacks are less educated and are poorer than whites).

## CHAPTER 4. SUSTAINING BIODIVERSITY AT SITES

**Site conservation planning**

Developing a readily accessible, reasonably fast and cost-effective means of conservation planning focused on conserving biological diversity at particular sites has proven to be an elusive goal for scientists and land managers. Conservation planning has to overcome many challenges, not the least of which is the need or desire to simultaneously accommodate many different, often competing goals, only one of which may be conserving biodiversity. The Nature Conservancy has developed a relatively simple, iterative and biodiversity-centered approach termed *site conservation planning* (The Nature Conservancy 1998a, 1998c). The goal of site conservation planning is to develop a set of workable conservation strategies that will allow the biological targets of conservation to persist over the long-term with as little input from humans as possible. In order for this to happen, the landscapes (of various scales) within which the species and ecosystems of concern exist, have to be protected or managed in a way that is hospitable to long-term persistence, while allowing for change and random perturbations.

This approach explicitly recognizes that ecosystems are complex moving targets, that ecosystem structure and composition are controlled by processes operating at many different spatiotemporal scales simultaneously, and that biologists have little understanding of the structure and function or life history needs of most of the ecosystems and species that they seek to conserve. Thus, all knowledge is treated as provisional, and the planning *process* becomes as important as the *information* used in planning.

**Biological diversity and functional landscapes**

Biodiversity is often defined as simply the number of species occupying a given area (e.g., species richness). However, this definition vastly oversimplifies nature. Scientists now recognize that biodiversity exists at several levels of biological organization. These levels are typically defined as genes, species/populations, communities/ecosystems, and landscapes, and more recently, also include the dynamic, multi-scale processes that sustain structure and function (reviewed in Poiani et al. In review). Although all levels are important, The Nature Conservancy focuses planning efforts at the population/species (hereafter "species") and community/ecosystem (hereafter "community") levels, primarily because this choice offers a relatively unambiguous starting point and some hope that success can be evaluated over time. We term these choices *site conservation targets*, which are a subset of the *ecoregional targets* that occur in a given geographic area or site discussed in Chapter 2. In the GCPEP region, 115 species-level and 115 community-level ecoregional targets were identified.

Ecosystems, and to some extent, natural communities, can be defined as "...dynamic assemblages or complexes of plant and/or animal species... that (1) occur together on the landscape; (2) are tied together by similar ecological processes..., underlying environmental features..., or environmental gradients..., and (3) form a cohesive and distinguishable unit on the ground" (Poiani et al. In review). Similarly, ecosystems also occur at a variety of spatial and temporal scales, from very localized occurrences (e.g., a rare plant occurring on an unusual geographic formation) to regional ecosystems stretching over tens of millions of acres (e.g.,

longleaf pine-dominated plant communities). Combining biological levels *and* spatial scales provides a relatively simple and useful framework for thinking about conservation planning (Figure 4-1).

In addition to the choice of species and communities as the focus of conservation efforts, TNC also currently defines four overlapping geographic scales—*local, intermediate, coarse and regional*—to be used in defining functional conservation areas capable of sustaining biodiversity over the long-term (Figure 4-1). For example, a viable population of 200 adult black bears will require an area of several million acres in northwest Florida, encompassing many different natural community types, large relatively undisturbed areas, and with abundant safe movement corridors between home ranges. Black bears would be termed a “coarse scale species” because home ranges typically include several different vegetation communities or patches throughout the year, including agricultural areas. A “local scale species” would be a rare plant that inhabits only a certain limited soil type. Similarly, developing definitions of vegetation communities as “small patch” (local) “large patch” (intermediate) or “matrix” (coarse or regional) is very useful in determining conservation goals for plant communities at the landscape-scale (Figure 4-1).

A landscape capable of conserving the targets over time is termed *functional* if it meets two key criteria (Poiani et al. In review);

- 1) Conserves clearly defined site conservation targets (species and communities);
- 2) Protects the multi-scale ecological processes that sustain the conservation targets over time.

Further, functional landscapes have several important characteristics: 1) their size, shape or other characteristics are defined by the needs of selected conservation targets at a given site; 2) key natural processes and appropriate structure exist within natural ranges of variation as defined by what is required to sustain the conservation targets over long time horizons (>100 years); 3) conflicts over human uses are inevitable; and 4) ecological management and restoration likely will be required at all scales (Poiani et al. In review). An important consequence of this approach is that the boundaries of a given conservation landscape will vary with the ecological needs of different targets; any one landscape can consist of a number of different sized and shaped “sites” nested within the larger landscape. Thus, the choice of targets will define the threats to the targets, the site boundaries, and in large part, the choice of conservation partners.

### Choosing site planning targets

Once conservation targets have been chosen for a site through ecoregional planning (Chapter 2) then managers should choose for planning purposes a smaller subset of the targets that occur at a site. As stated previously, both ecoregional and site targets are defined as 1) populations of species and 2) definable and mappable natural communities or 3) some other ecological unit (e.g., ecological complex, species guilds, etc.). Nature Conservancy practitioners refer to these as *site planning targets*. Attempting to use all *conservation* targets for planning purposes is often impossible because many species-level targets have little known life histories and/or because in large sites with many targets, analysis would be too unwieldy or complex. At the site level, appropriate choice of planning targets is the single most important step. All other conservation-related analyses and resulting management strategies are directed at abating the

threats to persistence of these planning targets, and indirectly, the entire suite of conservation targets.

The goal is to choose a set of conservation targets that represent multiple levels of biological organization, have different life history requirements, depend on different ecological processes, and encompass a variety of different spatial scales. In effect, planning targets act as conservation umbrellas or surrogates, however imperfectly, for all other similar target species and natural communities occurring in the geographic area. Thus, planning targets, whether community or species-level, are used to cumulatively address the ecological requirements for all species and communities occurring at a site.

Multiple species targets may be grouped together by functional guilds (e.g., shorebirds) or a single keystone species may act as a surrogate for a host of functionally related species (e.g., gopher tortoises as surrogates for all species using gopher tortoise burrows). At a higher level, groups of communities that occur together can be grouped as ecological complexes (e.g., coastal swale and ridge communities), or where one community type forms the dominant vegetation type in the landscape, within which many other communities and species are embedded, then matrix communities or mosaics can be defined (e.g., longleaf pine-turkey oak-bluestem matrix).

### **Defining site planning targets for GCPEP**

Specific site planning targets for GCPEP were derived from a set of simple analyses that examined the distribution of the 115 species-level ecoregional targets across the GCPEP landscape. In all, eight primary planning targets have been identified to date. Others may be added following further analysis (Table 4-1). For example, the choice of "seepage stream/slope complex" was based on an analysis of the distribution of approximately 65 rare plant and animal species occurrences on Eglin, the majority of which cluster around the steephead creek (seepage creek) complexes. Expert opinion suggested that protection of the seepage stream complexes would protect the conservation targets, including the associated slope forests and aquatic communities. Thus, conservation strategies (yet to be defined in detail), will center around restoration of linear fragmentation, repair of road crossings, and restoration of ecological gradients. Fire will be used to establish and maintain ecotones. A complete list of suggested GCPEP planning targets is included in Table 4-1.

### **Stresses and sources of stress to planning targets**

Once planning targets have been identified, then *threats* can be articulated (Table 4-2). Threats are anything that compromises the long-term viability of the target at the site. A threat is defined as a *stress* and its *source*. For example, large-scale habitat fragmentation causes demographic isolation in red-cockaded woodpeckers populations (a stress) as a direct result of traditional even-aged forestry practices applied at the landscape-scale (a source of stress).

The combination of targets, goals and threats define the boundaries of the site. For example, black bears probably occur on all individual ownerships within GCPEP, but a viable population (estimated at 200 bears) requires all of the GCPEP ownerships collectively, plus adjacent private lands not included in GCPEP. Table 4-3 combines targets and threats (in this



case, sources of stress) by site. Rankings in all of the following tables are based on expert opinions about the relative severity and immediacy of the threat to the target and act as a filter for prioritizing key threats for the purpose of developing *conservation strategies*. (For an explanation of ranking criteria, see Tables 4-4 and 4-5.) Conservation strategies are designed to abate threats to conservation targets at sites and will be addressed in a future technical report. In the tables that follow, we identify particular GCPEP sites, the planning targets, and an assessment of the stresses and sources of stress to targets at sites.

### Summary of findings

Of the 115 species-level ecoregional targets that occur in the GCPEP landscape, three (red-cockaded woodpeckers, black bears, flatwood salamanders) were chosen as planning targets. All three were chosen because they are declining across their range, each of them has large area requirements (relative to their body sizes), they are found on the majority of GCPEP acres and they would not necessarily be well protected through habitat management alone. Of the 297 ecoregional community/ecosystem-level targets, eight matrix-forming community types were chosen (longleaf pine sandhill matrix, longleaf pine flatwoods matrix, seepage stream/slope complex, blackwater rivers/streams, alluvial rivers/streams) as planning targets. Each of these matrix community types protect many rare, threatened and endangered species. The assumption is that if these systems are managed within appropriate ranges of variation, allowing or mimicking natural disturbance processes, and restoring structure and function where seriously impaired, then the majority of species-level targets would be protected.

Overall, the most significant threats (as defined by sources of stress in this case) to terrestrial targets were incompatible fire management and incompatible residential development, followed by unstable/inadequate funding and incompatible forestry. The most significant threats to aquatic targets were incompatible farming practices, incompatible residential development, roads and utility corridors, incompatible silviculture and land management practices, followed by inadequate/unstable funding and recreation.

TABLE 4-1. Conservation planning targets at Gulf Coastal Plain Ecosystem Partnership Sites.

Conservation Planning Targets	Site
Longleaf pine sandhill matrix	Eglin AFB, Champion International, Blackwater River State Forest
Longleaf pine flatwoods matrix	Blackwater River State Forest, Conecuh National Forest, Eglin AFB
Seepage stream/slope complex	Eglin Air Force Base, Champion International, Blackwater River State Forest
Blackwater rivers/streams	Eglin AFB, Champion International, Blackwater River State Forest, Northwest Florida Water Management District, The Nature Conservancy
Alluvial rivers/streams	Champion International, Blackwater River State Forest, Northwest Florida Water Management District, The Nature Conservancy, Eglin AFB,
Red-cockaded woodpecker	Eglin AFB, Blackwater River State Forest, Conecuh National Forest

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<b>Conservation Planning Targets</b>	<b>Site</b>
Flatwoods salamander	Eglin AFB, Blackwater River State Forest, Conecuh National Forest, Champion International, Northwest Florida Water Management District
Florida black bear	Eglin AFB, Blackwater River State Forest, Conecuh National Forest, Champion International, Northwest Florida Water Management District, The Nature Conservancy

TABLE 4-2. Stresses and sources of stress to targets at sites within the Gulf Coastal Plain Ecosystem Partnership.

**SITE: Eglin AFB and buffer lands****Name of Target: Longleaf pine matrix and associated communities**

**Description:** At 463,000 acres, Eglin AFB is the largest and least fragmented, single longleaf pine ownership in the region of interest, and as such, is treated as a separate site. However, a number of Eglin conservation targets also occur on adjacent lands (e.g., Florida black bear). Eglin contains approximately 350,000 acres of longleaf pine sandhill, about 50% of which is considered to be in good or excellent condition. Eglin has the largest remaining stands of old-growth longleaf pine in existence. Upland-related conservation, planning and management targets on Eglin include the longleaf pine community matrix (sandhills, flatwoods, scrubby flatwoods, upland hardwood forest, upland mixed forest, sand pine scrub) described here, as well as seepage stream complexes, Florida black bears, red-cockaded woodpeckers and flatwoods salamanders (see below). An additional 85 ecoregional conservation targets occur on the site. Historically, longleaf pine was the dominant tree species on any site exposed to frequent, low intensity lightning or human-caused (interval of 2–7 years). Longleaf ecosystems have a simple structure comprised of open stands of large longleaf, few midstory hardwoods, and a diverse understory dominated by fire adapted forbs and grasses, especially bluestems. In addition to fire, major disturbance processes include lightning, occasional stand-replacing fires, droughts (once a decade on average), hurricanes or tropical storms (every 2–3 years on average), tornadoes, microbursts associated with convection storms, and intensive, small-scale, animal-caused soil disturbance. The greater longleaf pine ecosystem has declined by more than 95% across its range in the Southeast. Major sources of decline have been conversion, development, over-harvest and fire suppression.

**Stresses: Longleaf pine matrix and associated communities**

<b>Stress</b>	<b>Stress Rank</b>
Sand pine invasion	VH
Altered fire regime/hardwood encroachment	H
Habitat conversion	H
Soil disturbance	M
Loss of biological buffers and connectedness	VH
Habitat fragmentation	M

## Sources of Stress: Longleaf pine matrix and associated communities

<b>Sources of Stress</b>	<b>Stresses</b>						<b>Overall Threat Rank</b>
	Sand pine invasion	Altered fire regime/hardwood encroachment	Soil disturbance	Loss of biological buffers and connectedness	Habitat conversion	Habitat fragmentation	
Incompatible forestry practices (Eglin/buffer)	M	M	M	M	L	L	L-M
Primary home development (buffer)	L	M		VH	VH	VH	H
Military mission activities	M	M	L		M	L	L-M
Roads and utility corridors (Eglin/buffer)	H	M		H	H		H
Unstable funding	H	M					M-H
Smoke containment (Eglin/buffer)	M	H	L	M			M

## GCPEP and Biodiversity Conservation

**SITE:** Blackwater River State Forest/Conecuh National Forest/Champion International Buffer lands

**Name of Target:** Longleaf pine flatwood matrix and associated communities

**Description:** Same as for Eglin AFB above, except that this landscape has highly fragmented public-private ownership; 286,000 acres of public lands are interdigitated by non-industrial and industrial timber holdings, small towns, housing developments, second homes, rural homesteads, pasture, cotton and tobacco fields, all of various sizes and shapes. Also, the longleaf pine dominated matrix is comprised primarily of flatwoods, scrubby flatwoods, mixed upland forest and mixed hardwood forest. While the longleaf community matrix is the primary conservation, planning and management target, at least 50 ecoregional targets also occur here.

**Stresses:** Longleaf pine flatwood matrix and associated communities

<b>Stress</b>	<b>Stress Rank</b>
Alteration of fire regime/hardwood encroachment	H
Habitat conversion/fragmentation	H
Soil disturbance/herbicides	H
Loss of biological buffers	VH

## Sources of Stress: Longleaf pine flatwood matrix and associated communities

Sources of Stress	Stresses				Overall Threat Rank
	Alteration of fire regime/hardwood encroachment	Habitat conversion/fragmentation	Soil disturbance/herbicides	Loss of biological buffers	
Incompatible forestry practices (buffer)	M	H	H	L	H
Development/roads/utility corridors (sites and	VH	VH		VH	VH
Public attitudes	H		H		H
Unstable funding	VH		H		VH
Off-road vehicle use			M		M
Smoke management	H		M	H	H

**SITE: Eglin AFB****Name of Target: Seepage stream/slope complex**

**Description:** Eglin AFB's longleaf pine uplands are dissected by numerous streams systems that head on Eglin's main sandhill ridge and flow into Choctawhatchee Bay or the Yellow River. These unique streams are known locally as "steepheads" or seepage streams and occur in deep sand soils with rapid percolation of rainwater. Water is stored in the sand aquifer and slowly released as springs or seeps. Some seepage streams may have their origin in major limestone aquifers, but this relationship has not been firmly established on Eglin. Seepage streams have relatively invariant flows of clear water of nearly constant temperature running over shifting sand bottoms. Seepage streams form steep headwalls, slopes and ravines as they cut uphill into sand ridges, creating exceptional vertical complexity in an otherwise topographically challenged landscape. The seepage stream complex includes seepage streams, seepage slopes, baygalls, slope forest, upland hardwood forest and upland mixed forest. These systems probably burn every 50-100 years, but the precise fire regime is not well understood. These are arguably the most species-rich systems on Eglin and are extremely important for a host of G1-G2 plant and animal species, including many pitcher plants, the endemic Okaloosa darter and several species of undescribed salamanders. Because sandhill and seepage systems have received such extensive disturbance elsewhere in the Southeast, Eglin's seepage stream complex is among the largest and most important remaining examples.

**Stresses: Seepage stream complex**

<b>Stress</b>	<b>Stress Rank</b>
Altered hydrological regime	H
Sedimentation	H
Alteration of fire regime	H
Habitat fragmentation	H
Loss of canopy cover	M
Exotics (plants)	M

## Sources of Stress: Seepage stream/slope complex

Sources of Stress	Stresses						Overall Threat Rank
	Altered hydrological regime	Sedimentation	Altered fire regime	Habitat fragmentation (riparian corridors and fish movement)	Loss of canopy cover	Invasive exotics (plants and off-site native fish)	
Clay mining	VH	VH			VH	H	VH
Roads and road crossings	VH	VH	H	H		M	H
Military test ranges	H	L	H	H	M	M	M-H
Dams and impoundments	L	M		M	M	VH	M
Fire plowlines or soil disturbance (logging)	H	L	M	L	L	L	M
Groundwater pumping (?)	VH?						VH?



**SITE: Gulf Coastal Plain Ecosystem Partnership**

**Name of Target:** Blackwater rivers/streams

**Description:** Blackwater streams originate in sandy lowlands and drain extensive wetlands of organic soils. The tea-colored water of these streams is colored by tannins, particulates, and dissolved organic matter and iron derived from drainage through wetlands. Blackwater streams have sandy bottoms and are continually shifting. Although these streams are widely distributed in the southeastern coastal plain, many have had major disturbances or alterations and are less biologically productive. The Blackwater, Yellow and Shoal Rivers drain over 2700 square miles and are highly biologically productive. The Yellow/Shoal watershed has been identified as critical hotspot of national significance for protecting 12 at-risk fish and mussels and the Blackwater system for protecting a high diversity of rare aquatic insects. Main water quality threats are excessive sedimentation from roads, gully erosion from agricultural fields, increased biological oxygen demand from agricultural runoff and growth/development. As of 1998 in northern Santa Rosa County alone, the federal government has spent \$2.65 million to attempt to stop 27 gullies.

**Stresses:** Blackwater rivers/streams

<b>Stress</b>	<b>Stress Rank</b>
Sedimentation	<b>VH</b>
Nutrient Enrichment	<b>H</b>
Contaminants/Toxins	<b>L</b>
Habitat Destruction	<b>M</b>

## Sources of Stress: Blackwater rivers/streams

Sources of Stress	Stresses				Overall Threat Rank
	Sediment	Nutrient Enrichment	Toxins	Habitat Destruction	
Incompatible land use (roads, bridges, recreation)	VH	M		VH	H
Incompatible development (residential, commercial)	M	H	M	M	M
Incompatible farming practices (BMP's)	H	H	H	VH	H
Off-road vehicle use	M			H	L
Inadequate Funding	H	H		H	H

GCPEP and Biodiversity Conservation

**SITE:** Gulf Coastal Plain Ecosystem Partnership

**Name of Target:** Alluvial rivers/streams

**Description:** Alluvial rivers originate in high uplands primarily composed of sandy clays and clayey-silty sands. These rivers are typically turbid due to a high content of suspended particulates and have a large range of flow rates and sediment loads. Flooding which generally occurs once or twice a year, is a controlling factor in the reproductive cycle of many organisms and is also important in providing woody debris, minerals and nutrients to floodplain communities. Portions of two watersheds found in the GCPEP, the Conecuh/Escambia and the Choctawhatchee are identified as critical systems for protecting at-risk fish and mussels (15 and 14, respectively). Of nine freshwater mollusk target species found in GCPEP waters, eight are G1 or G2 species and five are endemic to the Conecuh /Escambia and Choctawhatchee rivers. Main water quality threats are associated with dairy, agricultural and woodland runoff, as well as road runoff, wastewater discharges, and urbanization.

**Stresses:** Alluvial Rivers/Streams

<b>Stress</b>	<b>Stress Rank</b>
Sedimentation	<b>VH</b>
Nutrient Enrichment	<b>H</b>
Habitat Destruction	<b>L</b>
Contaminants/Toxins	<b>M</b>

## Sources of Stress: Alluvial rivers/streams

Sources of Stress	Stresses				Overall Threat Rank
	Sediment	Nutrient Enrichment	Toxins	Habitat destruction	
Incompatible farming practices	VH	H	H	H	H
Incompatible economic development	M		L		L-M
Incompatible wastewater discharge		H	H	M	M-H
Incompatible residential development	M	M	L	M	M
Incompatible road/utility development	H			M	M-H
Off-road vehicle use	M			L	L-M
Inadequate funding	VH	VH	VH	VH	VH

**SITE:** Gulf Coastal Plain Ecosystem Partnership**Name of Target:** Red-cockaded woodpeckers

**Description:** Red-cockaded woodpeckers (RCWs) were federally listed as endangered in 1970 under the Endangered Species Act and have seen dramatic decreases across their range. Declines are due to habitat loss, demographic isolation, fire exclusion/suppression of open pine habitats, and loss of old trees (>100 years) required for cavity excavation. RCWs excavate cavities in living pine trees and have evolved a cooperative breeding behavior that limits habitat occupation to sites that have existing RCW cavities; hence, natural population expansion is slow even when otherwise excellent habitat is available. RCW family groups defend large home ranges (150–500 acres) and viable populations (>100 years) require relatively high densities (300 to 500 breeding pairs) in order to survive expected fluctuations in key habitat and demographic variables. Evidence suggests that RCW productivity is directly related to the diversity and quality of the understory plant-insect community, which is mediated by frequent fire. Because of the large area required to establish and maintain a viable population, RCW recovery is a politically charged issue. On GCPEP lands, Eglin Air Force Base has a large population, which has grown from an estimated population of 217 active clusters in 1994 to 285 in 1998, reversing what appears to have been sharp declines over several decades. Population increases were the result of extensive reintroduction of prescribed fire beginning in 1992, and secondly, due to creation of artificial cavities in suitable unoccupied habitat. Blackwater River State Forest and Conecuh National Forest, on the other hand, have had historically documented declines attributed to loss of cavity trees and suitable foraging habitat. Currently Blackwater has 18 active clusters and Conecuh has 17. Specific population goals have not yet been set for each of the GCPEP lands containing RCWs. RCW population changes (natural rates of increase/decrease) can serve as one indicator of the integrity of fire-maintained longleaf pine ecosystems, and the many species that depend on the open pine habitats preferred by RCWs.

**Stresses:** Red-cockaded woodpeckers

<b>Stress</b>	<b>Stress Rank</b>
Alteration of natural fire regime	H
Habitat loss and fragmentation	M
Habitat degradation	M
Demographic isolation	VH
Cavity tree mortality	M

Sources of Stress: Red-cockaded woodpeckers

Sources of Stress	Stresses					Overall Threat Rank
	Altered Fire Regime	Habitat loss and fragmentation	Habitat degradation	Demographic isolation	Cavity tree mortality	
Incompatible silviculture (plantations, off-site species)	H	H	H	VH		H
Incompatible fire management	H	H	H	H	M	H
Incompatible land mgt. (site prep, herbicides)	H	L	M	L		M
Catastrophic events (hurricane, wildfire)	L	L	L	M	M	L-M

**SITE:** Eglin AFB-Champion Connector-Blackwater River SF**Name of Target:** Flatwoods salamander

**Description:** The flatwoods salamander (*Ambystoma cingulatum*) is a small (5 in.) salamander occupying wet pine flatwoods and scrubby flatwoods with naturally occurring ponds without large predatory fish. Its range is restricted to the lower coastal plain from Mississippi to South Carolina. This species is federally listed as Threatened. Relatively little is known about its natural history, but it appears that individuals have relatively large home ranges of more than 1500 m<sup>2</sup>. Adults live fossorially in pine flatwoods—perhaps in crayfish burrows—most of the year, moving to and from breeding ponds or puddles from October through January. Eggs are laid in clumps attached to detritus. Metamorphosis occurs within 90 days, with movement out of ponds and into uplands by March or April. Adults are apparently long-lived, perhaps up to 15 years. Pine flatwoods have been extensively drained and ditched for intensive silvicultural purposes throughout the salamander's range, resulting in locally reduced water tables. Many temporary ponds have been planted in pines or drained, and the common practice of winter burning may have detrimental effects during breeding migration. The common use of herbicides may also be a threat. Habitat bisected by heavily traveled roads may increase mortality. Because they require large home ranges relative to their body size, flatwoods salamander populations are vulnerable to any habitat disturbance that fragments movement or access to breeding ponds. Eglin has the largest breeding population east of the Apalachicola, and relict populations are also found on Champion International lands and Blackwater River State Forest. Eglin's population is considered to be relatively secure and well managed, while its status outside of Eglin is largely unknown. Specific population goals have not yet been set.

**Stresses:** Flatwoods salamander

<b>Stress</b>	<b>Stress Rank</b>
Habitat degradation	Very high
Increased mortality during migration	High
Alteration of natural fire regime (habitat change)	Medium
Habitat fragmentation or barriers to movement	Very high
Loss of breeding ponds	Very high
Increased predation in breeding ponds	Medium

Sources of Stress: Flatwoods salamander

Sources of Stress	Stresses						Overall Threat Rank
	Non-breeding Abbott degradation	Increased mortality during migration	Alteration of natural fire regime (habitat change)	Habitat fragmentation or barriers to movement	Loss of breeding ponds	Increased predation in breeding ponds	
Silviculturally related draining or ditching	H	H			VH		H
Increased roads and traffic	M	M	M	H	H		M-H
Introduction of predatory fish					L	M	L-M
Off-road vehicle use	M						M
Site conversion to pine plantation	VH		VH		H		H-VH



**SITE: Gulf Coastal Plain Ecosystem Partnership**

**Name of Target:** Florida black bear

**Description:** Black bears once ranged throughout most of North America in forested habitats. However, black bears now occupy from 5-10% of their historic range in the southeastern United States, mainly in large forested tracts and wetlands in public ownership. Viable populations can exist in highly modified agricultural landscapes, so long as adequate cover remains along rivers and swamps and hunting, poaching and vehicle mortality is kept to a minimum. On Eglin, bears typically spend 95% of their time within 300 meters of creek bottoms. Palmetto berries, insects, acorns and fruits are primary foods. Females have relatively small home ranges, and female offspring are likely to occupy adjacent territories. Males typically have very large home ranges, often overlapping with other males, and encompassing the home ranges of one or more females. Home range sizes vary considerably from population to population. Females give birth to 1-2 cubs every 2-3 years, depending on habitat quality and productivity. The Florida black bear (*Ursus americanus floridanus*) is listed as a threatened species in Florida. Eglin Air Force Base has one of the few apparently stable bear populations in Florida. Population estimates range from 50-75 bears in the immediate area. These bears also use other Gulf Coastal Plain Ecosystem Partnership (GCPEP) lands including Champion International, Northwest Florida Water Management District and possibly Blackwater River State Forest. GCPEP appears to have enough acreage to secure a moderately large population of black bears, and was identified by the Florida Game and Fresh Water Fish Commission as a "strategic habitat conservation area" for the black bear in Florida. This large area of suitable habitat may be critical to the long-term survival of black bears in the western coastal plain. Major threats to long-term persistence include increased mortality due to vehicle collisions and poaching, habitat loss due to urban development and demographic isolation due to habitat fragmentation. A specific population goal has not yet been set, but a minimally viable population is estimated to be 200 adults.

**Stresses:** Florida black bear

<b>Stress</b>	<b>Stress Rank</b>
Habitat Destruction/Conversion	H
Habitat Fragmentation	H
Exotic Species invasion of habitat	L
Increased mortality	L

Sources of Stress: Florida black bear

Sources of Stress	Stresses				Overall Threat Rank
	Habitat Destruction	Habitat Fragmentation	Exotic Species	Increased mortality	
Conversion to Ag/Silviculture	L				
Incompatible development (residential, commercial)	VH	H			H
Incompatible development of roads/utility corridors	H	H		VH	H
Invasive Species	L?		L?		L?
Poaching				VH	VH

TABLE 4-3a. Relationship among conservation targets and threats (stresses and sources of stress) at the Eglin AFB site, including some subsites within Eglin. Site planning targets have been somewhat modified to accommodate unique differences among sites.

	Conservation Targets							
	Longleaf pine sandhill-flatwoods matrix-east	Longleaf pine sandhill matrix-west	Seepage stream/slope/rare species complex	Red-cockaded woodpecker-east population	Red-cockaded woodpecker-west population	Florida black bear	Flatwoods salamander	Summary
THREATS								
Unstable/inadequate funding for management	H	H	H	L	L	H		M-H
Roads and utility corridors	M	H	VH	M	L	VH	M	M-H
Incompatible fire management/plowlines	H	VH	H	VH	H			H-VH
Incompatible adjacent development (residential/commercial)	M	VH	VH?			VH		H-VH
Incompatible silviculture/land management practices	VH	H	VH	VH	L		M	H
Harvest (poaching)						VH		VH
Military mission activities	M	H	H	M	M			M-H

TABLE 4-3b. Relationship among conservation targets and threats (stresses and sources of stress) at the Blackwater River State Forest site.

	Conservation Targets					
	Longleaf pine sandhill- flatwoods matrix	Seepage stream/slope rare plant complex	Red- cockaded woodpecker	Florida black bear	Flatwoods salamander	Summary
<b>THREATS</b>						
Unstable/inadequate funding for management	M	H	H	VH	M	H
Roads and utility corridors	H	VH	M	VH	M	H
Incompatible fire management/plowlines	VH	M	VH	L	VH	M-VH
Incompatible adjacent development (residential/commercial)	VH		M	VH	H	H-VH
Incompatible silviculture/land management practices	M	VH	H	L	VH	H
Harvest (poaching)				VH		VH

TABLE 4-3c. Relationship among conservation targets and threats (stresses and sources of stress) across the GCPEP landscape.

THREATS	Conservation Targets						Summary
	Blackwater river/streams-longleaf pine matrix(upper Blackwater River)	Blackwater River/bottom land hardwood/longleaf pine matrix (lower Blackwater River)	Alluvial rivers/ streams/ bottomland hardwoods (upper Yellow River)	Alluvial rivers/ streams/ bottomland hardwoods (lower Yellow/ Shoal River)	Gulf Sturgeon (Yellow/ Shoal River-Pensacola Bay)	Aquatic Fish/Mussel Complex (Yellow/ Shoal River)	
Incompatible land use (roads, bridges)	VH	M	L	M	M	M	M-H
Incompatible economic development	L	H	L	M	M	M	M
Incompatible residential development	L	H	L	VH	VH	VH	M-VH
Incompatible wastewater discharge	L	H	L	H	H	H	M-H
Incompatible farming practices	H	M	H	H	H	VH	H
Inadequate/unstable funding	H	H	H	H	H	H	H
Recreation	VH	H	L	M	VH	H	H

TABLE 4-3d. Relationship between conservation targets and threats (stresses and sources of stress) across the GCPEP landscape. This analyses considers threats to “coarse-scale” species targets that require the majority of the GCPEP landscape to meet the area and habitat requirements for viable populations. \*The gulf sturgeon is a tentative planning target.

<b>THREATS</b>	<b>Conservation Targets</b>			
	Florida Black Bear	Red-cockaded Woodpecker	Gulf Sturgeon*	Summary
Incompatible development (residential/commercial)	VH			VH
Roads and utility corridors	VH			VH
Smoke management/air quality		H		H
Incompatible silviculture/sedimentation			H	H
Incompatible agriculture/Sedimentation/			H	H
Harvest (poaching)			H	H

TABLE 4.4. Indicators and benchmarks used to evaluate stresses (Center for Compatible Economic Development 1999).

Severity of Damage – what level of damage can reasonably be expected within 10 years under current circumstances	
Very High	The stress is likely to <i>destroy</i> or <i>eliminate</i> the conservation target
High	The stress is likely to <i>seriously degrade</i> the long-term viability of the conservation target
Medium	The stress is likely to <i>moderately degrade</i> the long-term viability of the conservation target
Low	The stress is likely to <i>impair</i> the long-term viability of the conservation target

Duration/Irreversibility of Damage – how long term is the stress, or how likely is the conservation target to recover from the stress, assuming no intervention	
Very High	The stress is <i>very long-term</i> (e.g. 20 years or more) in duration; or the conservation target is <i>not likely</i> to ever recover, regenerate or re-establish itself at the site as a viable occurrence
High	The stress is <i>long-term</i> (e.g. 10 years) in duration; or the conservation target <i>may not</i> recover, regenerate or re-establish itself at the site as a viable occurrence
Medium	The stress is <i>medium-term</i> (e.g. 5 years) in duration; or the conservation target is <i>likely to</i> recover, regenerate or re-establish itself at the site as a viable occurrence
Low	The stress is <i>short-term</i> (e.g. 1-2 years) in duration; or the conservation target is <i>likely to</i> recover, regenerate or re-establish itself at the site as a viable occurrence

Scope of Damage – what is the geographic scope of impact on the conservation target at the site	
Very High	The stress is likely to be <i>very widespread or pervasive</i> in its scope, and affect the conservation target at its <i>locations throughout</i> the site
High	The stress is likely to be <i>relatively widespread</i> in its scope, and affect the conservation target at <i>many of its locations</i> at the site
Medium	The stress is likely to be <i>relatively localized</i> in its scope, and affect the conservation target at <i>some locations</i> at the site
Low	The stress is likely to be <i>very localized</i> in its scope, and affect the conservation target at a <i>limited area</i> at the site

TABLE 4.5. Indicators and benchmarks used to evaluate sources of stress (Center for Compatible Economic Development 1999).

Degree of contribution or "loading" of the Stress that can reasonably be expected to occur from the Source within 10 years, assuming no change in threat abatement	
Very High	The source is a <i>very large</i> contributor of the particular stress (e.g. contributes over 80% of the stress)
High	The source is a <i>substantial</i> contributor of the particular stress (e.g. contributes 40% to 80% of the stress)
Medium	The source is a <i>moderate but meaningful</i> contributor of the particular stress (e.g. contributes 20% to 40% of the stress)
Low	The source is a <i>low or insubstantial</i> contributor of the particular stress (e.g. contributes less than 20% of the stress)

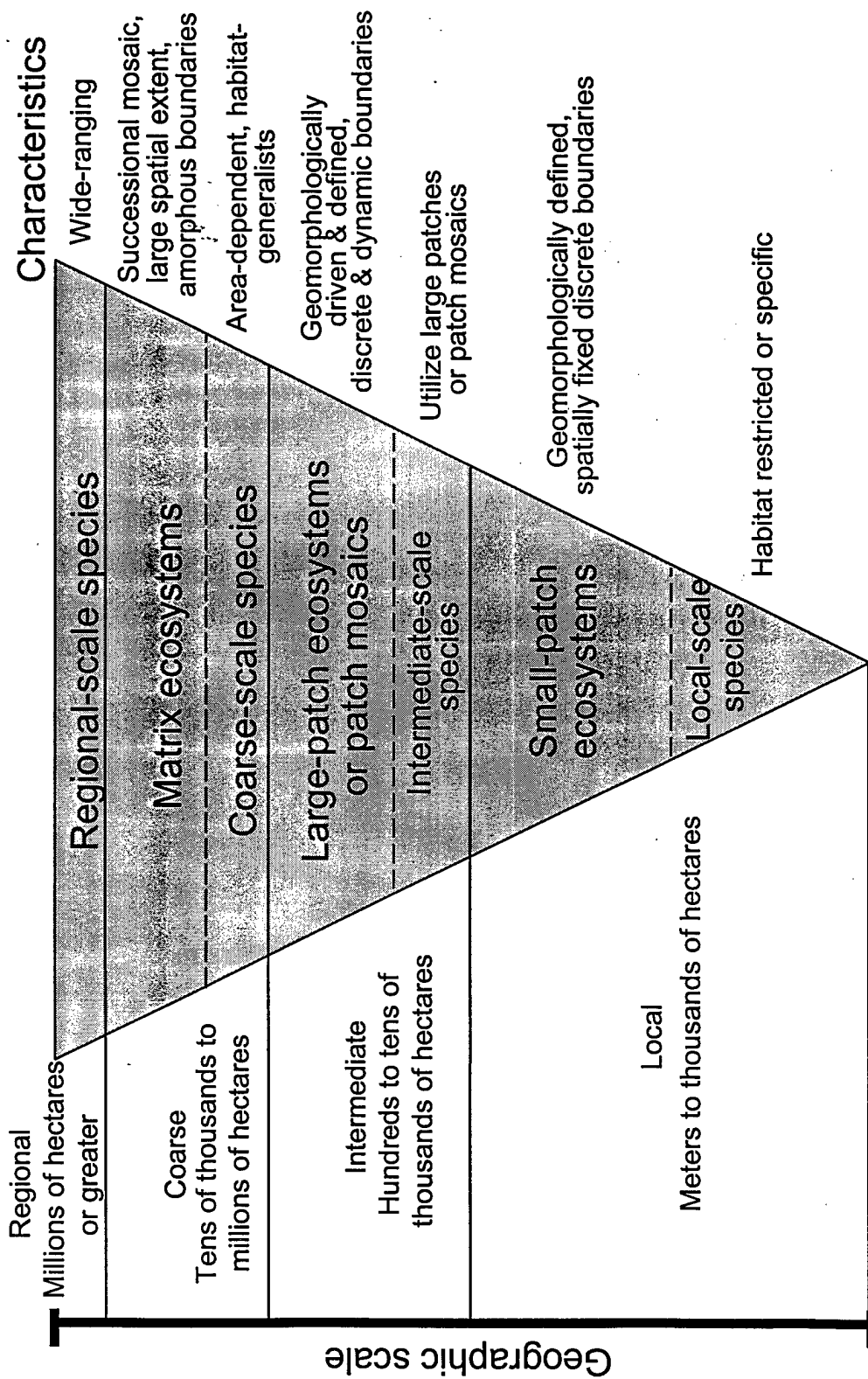
Duration/Irreversibility of the Source	
Very High	The source, once in place, is likely to be <i>very long-term</i> in duration (e.g. lasting or continuing over 20 years) and/or unlikely to be removed or abated
High	The source is likely to be <i>long-term</i> in duration (e.g. lasting over 10 years), and/or could be removed or abated, albeit with difficulty
Medium	The source is of <i>moderate</i> duration (e.g. lasting over 5 years), and/or could be removed or abated with moderate difficulty
Low	The source is of <i>short-term</i> duration (e.g. 1 to 4 years), and/or could be removed or abated

Urgency	
Very High	The threat is likely to be manifested to a degree that produces a <i>high impact within one year</i>
High	The threat is likely to be manifested to a degree that produces a <i>high impact within two to three years</i>
Medium	The threat is likely to be manifested to a degree that produces a <i>high or medium impact within five years</i>
Low	The threat is real, but <i>not likely</i> to manifest to a degree that produces a high or medium impact for five or more years



FIGURE 4-1. Biodiversity planning targets can be usefully organized by geographic scale (figure from Poiani et al. In review). Conservation targets range from local species with a very limited geographic range (e.g., Florida bog frog) or a geomorphologically defined patch ecosystem (e.g., a sandhill lake) to wide-ranging regional-scale species with large home ranges (e.g., Florida black bear) or regional-scale matrix ecosystems with very broad distributions (e.g., the landscape-level complex of longleaf pine dominated sandhill, flatwood and scrubby flatwood communities).

# Biodiversity and scale



## CHAPTER 5. GULF COASTAL PLAIN ECOSYSTEM PARTNERSHIP PLANNING PROCESS

### **Summary of Steering Committee meeting**

Meeting objectives. The Gulf Coastal Plain Ecosystem Partnership (GCPEP) Steering Committee met on December 1–2, 1998 at Bear Lake Recreation Area, Blackwater River State Forest. Issues discussed were to be related to conservation planning and operating guidelines. The meeting was designed to meet the following objectives:

1. Review tentative conservation targets and biodiversity significance of GCPEP;
2. Review seven to ten conservation objectives per partner on lands designated in GCPEP;
3. Agree on and prioritize common conservation objectives;
4. Agree on management challenges to common conservation objectives and list;
5. Review and finalize GCPEP operating guidelines;
6. Agree on procedures for adding new partners to GCPEP.

Meeting summary. This summary attempted to capture the most important information as recorded on flip charts and transcribed by note takers during the meeting. Editorializing was kept to a minimum except when needed to clarify the context of issues and recommendations. Some of the discussion and recommendations required interpretation. Any errors in translation or interpretation are the responsibility of the author and were unintentional.

Tentative conservation targets. The Nature Conservancy presented a report titled Conservation From An Ecoregional Perspective: The Biodiversity Significance Of The Gulf Coastal Plain Ecosystem Partnership. The list of conservation targets, found elsewhere in this report, was an initial attempt to provide the GCPEP with a conservation overview, realizing that individual partners in the GCPEP may have different species-level targets or none at all. It was hoped that the report would help GCPEP partners focus limited resources on the highest agreed upon conservation priorities.

The significance of the GCPEP lands are clearly stated in the report overview and include:

- GCPEP comprises only 2% of the 42 million acre East Gulf Coastal Plain Ecoregion area, but includes 38% of its natural communities and 37% of its target species;
- This landscape is considered one of the two most important landscapes in the Southeastern U.S. for conserving biodiversity;
- A national level analysis identified four GCPEP watersheds as critical hotspots for protecting at risk fish and mussel species.

The report also recognized the need for additional information on partner lands concerning occurrences and distribution of both species and community-level targets.

Partner conservation objectives. Each of the partners identified the seven to ten conservation objectives on lands they had designated in GCPEP. These objectives are listed below by partner. Learning the individual partner objectives will assist the partnership in

recognizing areas of expertise and needs among the partners and across the GCPEP landscape. These objectives will ultimately help shape the long-term conservation strategies and actions of the partnership.

Champion International

1. Understand biological resources present
2. What's at risk and how to manage
3. Formalization of common map
4. Cooperation to build needed wildlife connectors
5. Successful management of longleaf pine on an economic basis
6. Exotic species control
7. Cooperative erosion control
8. Public recreation management, including interpretation
9. National issues including combining economic and environmental stewardship, prospering with endangered species, and emulation of these successes beyond GCPEP to other landowners.

Blackwater River State Forest (Division of Forestry)

1. Longleaf pine/ wiregrass restoration
2. Increase prescribed burning
3. Increase public relations and outreach education
4. Protect endangered and other listed species
5. Increase erosion control efforts by controlling public access and improving/closing roads
6. Work on growth management issues within the forest boundary such as purchase of inholdings from willing sellers
7. Improve recreational management, particularly in reference to overuse or damage to areas
8. Control exotic species.

Eglin Air Force Base

1. Support the military mission
2. Restore ecosystem integrity
3. Red-cockaded woodpecker and other endangered/threatened species management
4. Game management
5. Increase prescribed fire to a three to five year rotation
6. Increase cost effectiveness of management activities
7. Protect, maintain and/or improve soil, water and air quality through control of erosion and increased research on aquatic resources/systems

8. Manage outdoor recreation consistent with the military mission (ecotourism)
9. Use adaptive management utilizing GIS, computer simulation models and other tools
10. Emphasize sustainable long-term income from forest management
11. Control exotic species such as hogs.

Conecuh National Forest (National Forests in Alabama)

1. Restore longleaf pine
2. Prescribed burning emphasizing growing season burning
3. Manage to increase the population of red-cockaded woodpeckers
4. Manage for rare and sensitive plants
5. Game management
6. Plan for and manage other recreational uses such as hunting, camping and natural heritage interests
7. Improve forest roads by controlling erosion and permanent or temporary/seasonal closure of needed roads.
8. Increase forest monitoring efforts, both plant and animal
9. Increase public relation effort to assist in meeting the needs of the local and state community
10. Survey for exotic species so control efforts can be initiated.

National Forests in Florida

1. Continue to be a primary donor of red-cockaded woodpeckers
2. Ecosystem management
3. Restore off-site slash pine to longleaf pine while maintaining a healthy groundcover
4. Maintain biodiversity of managed lands
5. Emphasize conservation of soil, water and air quality
6. Provide a sustainable supply of timber and other forest products
7. Prescribe burn on a three year rotation with 50% occurring during the growing season
8. Provide for recreational opportunities
9. Control access to reduce vehicle associated damage
10. Eradicate exotic species

The Nature Conservancy

1. Assist partners in conserving target species
2. Assist partners in conserving functional examples of community types (longleaf pine dominated matrix and embedded communities)

3. Work with each partner to ensure their management actions are biodiversity sensitive and consistent with each partners objectives
4. Work with partners to reduce external stresses and threats, while maintaining consistency with their objectives
5. Work to achieve long-term protection consistent with each partners objectives
6. Engage local people by linking ecosystem protection with economies, health and recreation
7. Learn from the partners

Northwest Florida Water Management District

1. Protect, maintain and improve water resources
2. Provide for protection and enhancement of water resources through integrated management
3. Restore, reforest and manage longleaf pine
4. Maintain existing public access
5. Complete stand description
6. Prioritize and develop action plans for erosion control
7. Protect the wet prairie habitat of Garcon Point with proper burn cycles
8. Enhance the recreation program while protecting the land
9. Continue timber management including loblolly and slash pine stands
10. Control trash/waste dumping through public outreach and road closures.

GCPEP conservation objectives. The development of sound conservation strategies depends upon first determining conservation targets and objectives and then management challenges and system stresses. With this in mind, individual partner conservation objectives were used in preparing the GCPEP conservation objectives. After identifying and discussing the priority objectives on a chart, each partner organization highlighted what they felt were the most important GCPEP objectives.

The objectives follow in priority order.

1. Conserve viable populations of target species
2. Introduce relatively natural fire regimes protecting key ecotypes
3. Protect urban interface and reduce fragmentation by use of conservation easements
4. Control erosion in ecologically sensitive areas
5. Manage recreation and public access
6. Increase communication, interaction and training among partners
7. Increase inventory and monitoring to further adaptive management
8. Increase public education and stakeholder involvement

9. Share resources
10. Secure outside funding and support
11. Inventory and control exotic species
12. Protect aquatic resources
13. Increase understanding of successful economic management of longleaf pine
14. Restore and manage the longleaf pine ecosystem
15. Recover the red-cockaded woodpecker
16. Game management
17. Conservation of examples of functional community types.

Challenges to GCPEP objectives. The partners then used the prioritized list of GCPEP conservation objectives to help in identification of management challenges to these objectives. A list of challenges was identified for each conservation objective. The following table identifies these challenges by objective.

TABLE 5-1 GCPEP Conservation objectives and challenges

Objectives	Challenges
Conserve viable populations of target species	<ol style="list-style-type: none"> <li>1. Lack of systematic inventory</li> <li>2. Lack of information on management impacts on target species</li> <li>3. Need for a clear conservation strategy for the connector corridor including use by large mammals and optimum size of corridor</li> <li>4. Lack of knowledge of biological importance of lands that surround GCPEP</li> <li>5. Need for prioritizing conservation targets by significance (species and communities)</li> </ol>
Introduce relatively natural fire regimes protecting key ecotypes	<ol style="list-style-type: none"> <li>1. Insufficient acreage burned</li> <li>2. Insufficient return interval</li> <li>3. Resistance to growing season burning due to public misconceptions</li> </ol>
Protect urban interface and reduce fragmentation by use of conservation easements	<ol style="list-style-type: none"> <li>1. Inholdings cause fragmentation and increased management problems</li> <li>2. Fragmentation may harm and cause difficulty in protecting species that require large areas</li> <li>3. Protection of water resources becomes increasingly difficult with fragmented ownerships</li> </ol>
Control erosion in ecologically sensitive areas	<ol style="list-style-type: none"> <li>1. Graded roads and public access points are major sources of erosion</li> <li>2. Erosion problems cross partner/non-partner boundaries</li> <li>3. Lack of native seed source and plant material</li> <li>4. Lack of funding sources for restoration projects</li> <li>5. Ecologically sensitive areas needing priority protection not identified</li> </ol>
Manage recreation and public access	<ol style="list-style-type: none"> <li>1. Lack of information, expertise and personnel to manage recreation carrying capacity and incompatible recreational activities</li> <li>2. Lack of law enforcement personnel</li> <li>3. Need for coordination by law enforcement on recreational issues</li> <li>4. Lack of quantification of negative recreational impacts</li> </ol>

<b>Objectives</b>	<b>Challenges</b>
Increase communication, interaction and training among partners	<ol style="list-style-type: none"> <li>1. Lack of internal communication among partners</li> <li>2. Need for shared GIS as a communications tool</li> <li>3. Need for establishment of radio and e-mail communication among partners</li> <li>4. Lack of shared organizational charts and contact lists among partners</li> <li>5. Need for partner visits with their staff on other partner lands</li> <li>6. Need for annual report/brochure listing important issues and topics</li> </ol>
Increase inventory and monitoring to further adaptive management	<ol style="list-style-type: none"> <li>1. Lack of common GIS product</li> <li>2. Insufficient aquatic inventory</li> <li>3. Lack of monitoring prioritization</li> <li>4. Insufficient resources for monitoring</li> <li>5. Mis-matched data sets and methods</li> </ol>
Increase public education and stakeholder involvement	<ol style="list-style-type: none"> <li>1. No communication plan</li> <li>2. Existing communication is often not strategic. Needs to be related to specific conservation objectives</li> <li>3. Lack of demonstration areas</li> <li>4. Lack of information on most effective types of communication</li> </ol>
Share resources more effectively	<ol style="list-style-type: none"> <li>1. Need to document resources that are available</li> <li>2. need to understand individual partner plans and solidify partnership plans</li> <li>3. Need to justify and demonstrate benefits</li> <li>4. Internal rules need to be understood and followed so as to better allow sharing of resources</li> </ol>
Secure additional outside funding and support	<ol style="list-style-type: none"> <li>1. Maintain funding to keep Project Director funded</li> <li>2. Lack of funding for staff to assist with project management</li> <li>3. lack of funding for priority projects</li> <li>4. Need for coordinated partnership response to increase chances of priority project funding</li> <li>5. Funding restrictions differ by partner</li> <li>6. Funding cycles differ among partners and sources</li> <li>7. Need for demonstration and documentation of successes</li> <li>8. Need for pursuit of non-money resources such as donations and volunteers</li> <li>9. Need for securing of cooperators that can provide equipment, time and/or money</li> <li>10. Need for strategy development with cooperators</li> </ol>
Exotic species control	<ol style="list-style-type: none"> <li>1. Lack of inventory</li> <li>2. Problem originates on non-partner lands</li> <li>3. Aggressive spreading of exotic species on partner lands from private property and roads</li> <li>4. Lack of knowledge on methods and techniques for control</li> <li>5. Need for coordination of control treatments</li> <li>6. Need for identification of additional funding sources</li> </ol>



Objectives	Challenges
Protection of aquatic resources	<ol style="list-style-type: none"> <li>1. Insufficient inventory of resources</li> <li>2. Limited control and influence due to parts of watersheds being outside of partner lands</li> <li>3. Increased water use related to increasing urban development</li> <li>4. Need for aquatic management plan</li> </ol>
Restoration and management of longleaf pine ecosystem	<ol style="list-style-type: none"> <li>1. Need for groundcover protection during management and restoration</li> <li>2. Lack of available cost information on reforestation, restoration and management</li> <li>3. Lack of market for hardwood removal contracts</li> <li>4. Possibility of Champion/Eglin landscape management strategy on connector parcel</li> <li>5. Need for combined partnership contracts on herbicides, chipping or other restoration techniques to reduce site prep costs</li> <li>6. Need for partnership agreements on restoration objectives</li> </ol>

Conservation of examples of functional community type. It was agreed upon by the partners to use the GCPEP tentative conservation targets, conservation objectives and management challenges to assist in the next steering committee meeting in the development of conservation strategies. First, major stresses and sources of stress to the priority natural systems will be identified by the partners to assure priority identification of the conservation strategies. Stresses may be defined as impacts to natural systems caused by destruction, degradation or impairment to a system. Often stresses are caused by incompatible human uses of resources, but may be caused by natural phenomena. For each stress there may be one or more causes or sources of stress. Identifying sources precisely is important, as addressing each different source may require very different strategies.

### Other issues

Operating guidelines. A Memorandum of Understanding (MOU) was signed by the partners in 1996. The MOU serves as the foundation of the partnership. The Steering Committee agreed upon the following operating guidelines to insure efficient operation of the partnership.

1. Each partner chooses representatives. The Steering Committee consists of a primary and alternate contact. The alternate contact may be represented by a designee chosen by the primary contact. There is one primary contact and one alternate contact per partner. Attendance and representation by each partner at the steering committee meetings is encouraged.
2. Consensus is desired in reaching agreements among the partners. If there is minority dissent, then the majority is charged with finding an alternative solution acceptable to all. The goal is to always maintain productivity while keeping the consensus process efficient.

A suggestion was made to consider having a Co-Chair for the Steering Committee. The Project Director serves as the Chair. Responsibilities of the Co-Chair were recommended to

include working with the Chair on setting meeting agendas and serving as an additional public relations spokesperson. The position was recommended to rotate annually among the partners. It was agreed that further discussion was needed by and between the partners before the next steering committee meeting.

New partners. Two agencies approached GCPEP during 1998 expressing interest in joining the partnership. The Steering Committee agreed that the addition of new partners should be based on objectives, targets and needs of GCPEP and that all new partners should be landowners. It was also recommended that an application process should be considered in which clearly defined benefits to GCPEP could be stated. Any application would be reviewed by the Steering Committee and agreement by consensus would be required. The partners clearly desire to work with cooperators in the GCPEP area and recognize their importance to the overall success of the partnership. Steering Committee consensus was to continue discussion on new partners during the next meeting.

Next meeting. The next steering committee meeting will be June 22-23, 1999 at the Champion International Research Office near Jay, Florida. The goal of the meeting will be to develop draft GCPEP conservation strategies and actions. Five to seven prioritized projects will be identified with measurable goals. After the meeting Champion will provide a tour of their Forest Resources and Land Management programs.

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## APPENDIX A. NEWS ARTICLES

## ENVIRONMENT

# Bird lovers try to save woodpecker

\$25,000 grant sparks efforts for preservation

By Jenny LaCoste  
News Journal staff writer

There are days when the traditionally serene Blackwater State Forest echoes with the sound of dozens of volunteers working to pull a species back from the brink of extinction.

A \$25,000 federal grant has renewed an interest among bird-lovers in the red-cockaded woodpecker, a bird that carves out its home in the heartwood of longleaf pines.

Although not as well known as the manatee or the Florida panther, the red-cockaded woodpecker is a charter member of the Endangered Species Act of 1973. Aggressive habitat restoration and breeding policies have boosted the population in some places in the Southeast, but in Blackwater State Forest the numbers have dropped precariously low.

"The population is very small. It's easy when you have a small number like that for it to decline rapidly," said Vernon Compton, project director for the Gulf Coastal Plain Ecosystem Partnership. "If this area is not intensively



Red-cockaded woodpeckers are still on the endangered species list.

managed now, the population will be completely lost in about 30 years."

Tom Arrington, Blackwater's ecology unit supervisor, said there are about 18 families of the birds living there. A family, or cluster, usually consists of between one and five birds.

Arrington said people always tell him they've spotted one of the rare birds in their backyards. "I can never convince them they're probably wrong," he said.

The red-cockaded woodpeckers are the smallest of the woodpeckers and actually have very little red on them



Tony Giberson/News Journal

Patty Kelley waits for the red-cockaded woodpecker to come to roost for the evening in the Blackwater State Forest. State officials are trying to bolster the dwindling population.

They are usually about 7 inches long and their most distinguishing characteristic is a black head with white cheek patches. The male's head has two red cockade feathers — barely visible un-

less close up.

Arrington said he's had hundreds of offers from volunteers to help save the bird — some from college students studying forestry, others from those who are simply nature-

lovers. They've helped with everything from watching the birds' flight patterns to clearing underbrush in the pine forests.

One of the greatest success  
See WOODPECKER, 4C

# Woodpecker still endangered

FROM IC

stories for the red-cockaded woodpecker has been restoration efforts on Eglin Air Force Base. About 280 clusters thrive on Eglin's reservation and the population is climbing.

Arrington said the difference between Eglin and Blackwater is that Eglin has plenty of century-old longleaf pines. At Blackwater, most of the pines are too young.

A tree has to be a minimum of 60 years old to have heartwood. Arrington said. "Otherwise, if you carve out a hole, the hole will fill with sap."

Arrington has been tracking the population at Blackwater for five years, but this year, money from the U.S. Fish and Wildlife Service, volunteer help and other donations have allowed officials at Blackwater to get proactive.

This month, Arrington began placing wooden boxes into young longleaf pines for the birds to nest. He hikes out in the forest every day, either at sunrise or sunset, to monitor how many bird families

have moved in.

"It's not new technology. It's been around a long time," Arrington said of the man-made inserts. "We just haven't had the money to do this."

Blackwater now has about 20 inserts, with half of them already in use.

"It's tough to climb that thing with a chain saw," he said, pointing to the skinny aluminum ladder he uses to scale the trees. Arrington hollows out a spot about 30 feet above the ground, places the box inside, and fills the gaps with putty. He paints the exterior the color of bark to fool the birds.

The activity at Blackwater has attracted attention from other organizations.

Patty Kelly, a research officer for U.S. Fish and Wildlife Service in Panama City, visits Blackwater State Forest about three times a week to help Arrington monitor the birds. Kelly makes the drive on her own time — either before daybreak or in the evenings after she leaves work.

Kelly and Arrington work as a team to trap the birds so they can

be banded. Arrington crouches near the base of a pine and carefully raises a long aluminum pole with mosquito netting to cover the cavity about 30 feet above him. Kelly then beats on the tree with a hose and scrapes at the bark, hoping to flush any birds out.

They wait expectantly, then try another tree. And another.

On a recent trip, Kelly and Arrington had no luck catching any of the birds, but she wasn't disappointed.

"It's just part of it," she said. "Field work can be pretty unpredictable. I'm just glad to be able to get out of the office and help out."

The local chapter of the Audubon Society pledged \$4,000 to help efforts at Blackwater. "It's a hunk of money for us, but it's different than sending money to somewhere like Ducks Unlimited where the help goes somewhere up north," said chapter president, Dana Timmons. "That's a good program, but we need to do our part at home first."

To find out more about the red-cockaded woodpecker or to help with habitat restoration, call Compton at 985-7414.

# READER'S FORUM

To discuss an opinion, call 435-8545 or 435-8543

## VIEWPOINT

### Champion manages its 480,000 acres with future generations in mind

Recently, community leaders suggested that Champion take a cue from St. Joe Company on how to manage and plan the future by setting aside land for development or preserves for public use.

The U.S. Constitution protects the right to own land, whether as a private individual or as a company, and allows landowners to choose how to use their land. The role of Champion's forest resources is to enhance the value of the land for its true owners, our shareholders.

Champion has long believed that practicing exemplary forest stewardship is the right thing to do, not only for the environment, but for our business. Our working forest supplies the renewable raw material for two existing manufacturing facilities and supports a variety of forestry contractors. As one of the



**JOANN M.  
COX**

largest landowners in Northwest Florida the company manages its 480,000 acres with future generations in mind.

Champion was a leader in the adoption of the American Forest and Paper Association's Sustainable Forestry Initiative (SFI), an ambitious set of principles and guidelines requiring companies to reforest promptly, provide wildlife habitat, improve water quality and

ecosystem diversity and protect places of special significance.

The cornerstone for sustainable forestry is our land classification system. Each forest stand managed by Champion was reviewed and assigned to one of four classes: areas to be protected and preserved; restricted areas where water, wildlife and other values take precedence over timber production; areas where timber production is the primary objective, but other functions deserve special emphasis; and areas that are best suited for intensive tree culture. Approximately one-third of our total ownership falls in one of the first three categories.

Champion also uses a rigorous internal Best Management Practices (BMPs) audit system of our forestry practices to protect water quality. Champion's Western Flori-

da Region is considered a role model in the implementation of sound and practical BMPs by our independent auditors.

Champion's commitment to sustainable forestry extends to ecological and social needs as well. For example:

■ Champion is the only private industrial owner among the seven partners in the Gulf Coast Plain Ecosystem Partnership (GCPEP), a cooperative effort to maintain the economical and environmental health of a shared 845,800-acre ecosystem.

■ In 1988, Champion assembled a team of natural-resource professionals to determine how to manage the company's river bottom land. Ultimately Champion conveyed 47,000 acres of river frontage along the Escambia. Yel-

low and Choctawhatchee rivers to the Northwest Florida Water Management District for the sustained management of water quality in the region.

■ In November 1998, Champion was the first forest products company to commit to an independent review of all its forest lands in the United States within the next three years.

■ On Feb. 25 the Governor's Council for Sustainable Florida presented Champion's Eastern and Western Forest Resource regions with the 1999 Sustainable Florida Award for Leadership. The award honors those who demonstrate the best performance standards in the integration of environmental, social and economic factors for the long-term sustainability of Florida. As Northwest Florida grows, land

use issues will continue to challenge community leaders and landowners.

I would like to suggest that the answer lies in the application of the principles of sustainability, as defined by the Governor's Council for Sustainable Florida: "sustainable should be understood to mean a fully integrated approach to the diverse but interrelated goals of a healthy environment, a prosperous economy, a satisfying quality of life, broad public participation and vibrant livable community."

Champion foresters, sustainable land use planners for decades, are more than willing to lend their experience to the process.

*Joann Meyer Cox is the general manager, Western Florida Region for Champion International Corp.*



# President's Message

Dana Timmons

## Endangered Species and Audubon

On Thursday, November 5, the board of directors of the Francis M. Weston Chapter of the Audubon Society voted unanimously to assist the Blackwater River State Forest in its efforts to strengthen its population of **Red-cockaded Woodpeckers**. Vernon Compton, director of the Gulf Coastal Plains Ecosystem Partnership, during his presentation at our October program, mentioned the efforts being made in the forest on behalf of the woodpecker. Already workers in Blackwater are banding birds and enhancing cavities as well as installing new cavity inserts, but further steps must be taken to help the sinking population. The plan is to bring five female birds to influence five single male clusters. The cost of the move is \$7,500 of which the US Fish and Wildlife Service has agreed to pay half. Our chapter has agreed to pay the additional half when the translocation permitting process has been completed.

The theme of our chapter meetings this year is endangered species. If you have not been attending our chapter meetings, you have missed out on some very interesting programs, and the best is yet to come. *Please take note of our January meeting date.* Instead of the fourth Thursday in January we have moved our program date to January 21<sup>st</sup> in order to accommodate the speaker, Dr. George Archibald, Director of the International Crane Foundation (ICF).

Since the founding of the ICF, he has studied the ecology of eight species of cranes in Australia, China, Iran, India, Japan, Korea, and the USA. Dr. Archibald helped organize nine Working Groups on Cranes, including more than 900 researchers in 64 nations. Under his direction, ICF has established a species bank of captive cranes and has been successful in consistently breeding significant numbers of several endangered species of cranes.

Please mark your calendars with this date change and plan to attend this important meeting.



# Education

Peggy Baker

## Where the Birds Are!

The President's Message tells of FMWAS' undertaking to play cupid to the **Red-cockaded Woodpeckers** at Blackwater National Forest. In an effort to ensure the survival of the RCW there, we are supporting an attempt to move some female birds to "where the boys are."

The RCW has a social system that centers around a family group that creates a "cluster." The females usually travel to another cluster in search of mates. But unfortunately, the cluster at Blackwater is too isolated and there are young males there without mates. FMWAS will contribute financially to the translocation of five young females to establish some new breeding pairs into this cluster.

The RCW cluster in Blackwater State Forest is relatively easy to see. In the spring and early summer, these birds can be seen throughout the day as they return to the cavities to feed the young. In the fall and winter, they continue to use the cavity for night lodgings, so the best sighting time is late in the day.

To see these birds, take Hwy 87 north in Milton. Turn right on Hwy 191. Go north on Hwy 191, past the Spring Hill community, to Hwy 68 at the Blackwater horse stables. Look for the stables sign because the road may be unmarked. Turn left on Hwy 68 and then turn right on the first dirt road which is called Three Notch Road but it may also be unmarked. In approximately one mile, look for the pine trees that are ringed with white paint which denote nesting trees. One of these trees is literally on the roadway on the right. This road will take you to Hwy 4. Another cluster near a paved road is in Conecuh National Forest just north of the Florida state line. Exit I-10 at Holt and go right (east) on Hwy 90 and left (north) on Hwy 189. This road becomes Alabama Hwy 137 at the state line. At Wing, AL, turn left on Hwy 4 (note: this is AL Hwy 4, not Hwy 4 at Baker). On the right side of AL Hwy 4, about one mile from Wing, there will be white-ringed pine trees near the road. Turn right on the dirt road that goes beside these trees and listen for the Red-Cockaded's call.

Good luck on seeing these beautiful endangered creatures that need our help to survive!



Tony Gliberson/News Journal

**GARCON POINT BURN:** The Gulf Coastal Plain Ecosystem Partnership burned about 2,000 acres of mostly wet prairie land on the Garcon Point peninsula Friday. The prescribed, or controlled, burn eliminates underbrush and lessens the threat of wildfires. John Little, above, works in the burn area. The partnership covers 845,500 acres in the Northwest Florida Water Management District, the state's Division of Forestry, Eglin Air Force Base, Champion International, The Nature Conservancy and national forests in Florida and Alabama.